PRINCIPLES OF LIBRARY CLASSIFICATION

WITH SPECIAL REFERENCE TO
COLON AND DECIMAL CLASSIFICATION

Part One

General Theory of Classification

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FOREWORD

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SUNANDA PUBLICATIONS, POO

OTHER BOOKS BY THE AUTHOR

1 GRANTHALAYA SHASTRACHA O-NA-MA Primer of Library Science in Marathi) Int national Book Service, Poona, 4 1933 Price R

2 THE DECIMAL & COLON CLASSIFICATIO (A Summary and A Comparison), N K Publish House, Poona, 2 1945 Price Rs.

3 REFFRENCE SERVICE IN LIBRARIES N K Publishing House, Poona, 2 1945 Price Rs

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DEDICATED

To

HIS HIGHNESS RAJA SHRIMANT

SIR RAGHUNATHRAO SHANKARRAO

PANDIT PANT SACHIV

K. C. I. E.

RAJA OF BHOR



With Deep Sense Of Gratitude

and

Highest Regard

With The Kind Permission

of

THE RAJASAHEB.

FOREWORD

It gave me great pleasure to peruse the typescript of the *Principles of Library Classification with special reference to Colon and Decimal Classifications* written by my esteemed friend Shri R S Parkhi Librarian of the Fergusson College Poona It is now nearly twenty years since Parkhi spent a couple of months with me at Madras in our joint pursuit of Library Science Our ideas were then very primitive Since then we have both endeavoured to improve our grasp of the subject Though we had been separated in place in all these years we had been always united in our thought and in our endeavour to labour for the cause of Library Service

Mr Parkhi s continued work in the subject has already led him to publish a few books Here is another instalment from his tireless pen In this book Mr Parkhi expounds the theory of Library Classification in a form which is easily assimilable

I am sure that this will be of special help to the students studying Library Science in the different Universities But its value is more than that of a text-book All librarians will find this to be a good introduction to the foundations of Library Classification

S. R. Ranganathan

"We have in that town a civic library, and its keepers on request, always know where to find what to me is lost, and sometimes is what I did not know existed To my constant surprise they will go direct to the knowledge I lack They seem to think it their duty to give to school-children and authors alike the *means to help themselves in that little matter of* ignorance I suppose the librarian must have some insight into the secret of the widow's cruse which replenished miraculously however much was taken from it. His ministration has the nature of a religious rite and for that reason I fancy he should never enter the temple at all unless aware that he is the Keeper of something which, if lost, would leave us all in darkness."

H. M. Tomlinson

PREFACE

It was the great fortune of the author of this book that just after three years of the publication of his previous book, *viz* the *Decimal and Colon Classifications* (A Summary and A Comparison) he got the opportunity of delivering a course of lectures on the *Principles of Library Classification* with special reference to Colon and Decimal Classifications to the students of the Diploma class in Library Science of the University of Bombay, during the years 1948 and 1949 due to the kind invitation from syt D N Marshall, the learned librarian of the Bombay University Library

Dr P M Joshi, the Director of Archives, Government of Bombay and former Librarian of the Bombay University Library has been a source of inspiration and encouragement to the author for many years past. It was he who first gave the author the opportunity of delivering lectures to the students of the Diploma in Librarianship of the University of Bombay It was also he who made it possible for the author to publish the above mentioned book and another book, *viz* *Reference Service in Libraries* in the Kai Khushru Taraporevala Memorial Series in Library Science

Syt Marshall, since the time, he took charge of the post of the Librarian of the Bombay University Library has also been a great source of inspiration and encouragement to the author in all his humble efforts for the noble cause of the library profession Particularly, in respect of this book, from the very beginning he has rendered great help and guidance to the author He attended the lectures of the author made very valuable suggestions for the proper presentation of the subject to the students of the class read the manuscript of the book carefully and made some useful suggestion for its improvement and helped in many other respects in the publication of this book

It is quite impossible for the author to express in words how much indebted he is to Dr S R Ranganathan who was the very first source of inspiration and taught the first lesson in Library Science to the author in 1932 and since then has been guiding him in all the development in his studies of the subject The manuscript of the present publication has been critically examined by him and the author deems it a great fortune to have his valuable FOREWORD for the book

The task of classification in libraries has been becoming more and more complicated due to the immence flow of literature and still more complicated due to various multi-dimensional difficult problems in research that are required to be tackled by the present-day scholar Now the librarians have to

classify not only books and periodicals but they have also to classify—and classify as much minutely as possible—the articles and research papers appearing in various periodical publications and feature them in a list of entries in a manner, which is, at once, helpful to research worker, and saves much of his time and also the time of the reference librarian and allows the featuring to remain upto date This is called *Documentation Service in Libraries*. As changes in the theories of the various branches of knowledge have been rapidly taking place due to the new researches and new inventions so also it is but natural that the methods and theories of classification should change and adjust themselves so as to become suitable to the gradually changing trend of knowledge and thought To bring about systematic changes in the theories of classification a great research is necessary and at present this problem has been very seriously discussed by the leading librarians The Unesco is working hard for the colaboration of the various researches of the different librarians of the International reputation In this regard, Dr Ranganathan in his most stimulating and inspiring address at the Unesco's First International Summer School of Librarianship in 1948 observes thus—

" I shall assume that changes in classification are necessary permissible, and practicable Then research in classification is necessary Such a research should be on a co-operative basis between the library profession

and the profession which specialises in the region of the field of knowledge in which the crisis has developed to a breaking point The business of the latter is to feature the specific subjects in the region in the most helpful order The business of the former is to apply facet and phase analysis and determine the foci as to fit the specific subjects with class numbers that throw them in the preferred helpful order Experience of break-down in a few regions and the rebuilding in them may lead us to discover more powerful and lasting notational devices " (In the *Journal of Documentation* Aslib V 4 March 1949 Pp 243-44 52, Bloomsbury St, London, WC 1)

The book is mainly based on the *Prolegomena to Library Classification* of Dr Ranganathan with a few references from the books of (1) E C Richardson (2) W C Berwick Sayers and (3) Henry Evelyn Bliss It is hoped that the book will be found useful by the students of the various Library Training Courses as an easy introduction to the subject of classification It may also help them in the revision of the subject at the time of the examination The author got inspiration to prepare this book from his study of the very valuable works of the authors mentioned above and especially the *Prolegomena to Library Classification*

Whatever good points the reader may find in this book the credit for them goes to the great pioneering auth r mentioned above But for all the

faults including the presentation of the matter and some misprints in the book, the author is soley responsible and humbly begs pardon of the reader for the same The author will be grateful to the readers if they show the same sympathy and encouragement as is always received by him at the hands of his admirers and sympathisers already mentioned above in this preface The author hopes and trusts that the brother hood of librarians, the students of library science and those who are interested in this profession will generously patronise this humble attempt of his and encourage him for further useful service in the line.

Fergusson College, Poona 4 *R. S Parkhi*
Vijayadashami, 20 October, 1950

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The author acknowledges his indebtedness

(1) to the respected authorities of the Deccan Education Society for giving him facilities and encouragement in specialising in this profession during the last 28 years and more, while rendering humble service in the Bai Jerbai Wadia Library of the Fergusson College as its librarian

(2) to Dr S R Ranganathan the revered *Guru* of the author for the invaluable help, guidance and encouragement that the author has received from him in preparing the manuscript of this book and for his kind *Foreword*;

(3) to Dr P M Joshi for his continued sympathetic help and guidance in various respects

(4) to Syt D N Marshall for giving the author the valuable opportunity of delivering lectures to the students of the Diploma in Librarianship of the University of Bombay and all the encouragement and guidance given by him for the publication of this book

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(7) to Syt D R Kanegaonkar the learned proprietor of the Prafulla Printing Press and the publisher of this book, for kindly taking up the responsibility of publishing this book and for the efficient expeditious and obliging way in which the printing was done

(8) to the kith and kin of the author and those respected persons and friends whose ever growing affection sympathy encouragement and unstinted help are mainly responsible for the progress the author has been able to make so far

(9) and, last but not least, to the University of Bombay for the grant-in aid received by him from the University towards the cost of publication of this work.

Fergusson College Poona 4 *R S Parkhi*
Vijayadashami, 20 October 19[illegible]0

A FEW WORDS BY THE PUBLISHER

We have great pleasure to publish this useful work of Shri R S Parkhi who has been the librarian of the well known Bal Jerbai Wadia Library of the Fergusson College, Poona for the last 28 years and more He has already earned reputation and wide popularity in the field of library profession on account of his incessant efforts for the furtherance of the noble cause of his profession His previous publications which have been mentioned elsewhere in this book, have been highly spoken of and have received wide circulation. Dr Ranganathan has already evaluated the worth of the book in his FOREWORD In publishing this book, our aim is just to render our humble service to the profession Books on library science written by authors in our land are very few This is because the problem of library management has not so far been looked upon as a vital one as is done in other leading nations like the U S A., U K , and U S S R. It is therefore our frank conviction that publications

the various present-day problems of library management, helping country-wide library movement, must be brought out as profusely as possible. If this venture of ours finds generous response from the library world in general and the library world in India, in particular, we intend to produce similar publications in future.

D. R. Kanegaonkar
Publisher

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As I pondered thus upon the unified nature of library service, I discovered that classification could be thought of only in relation to the part it contributed to a final goal. Again it resumed a kind of central position but this time instead of resuming also its separate entity it seemed to radiate throughout the structure – a shaft of illumination, lighting up and strengthening all library service. It seemed to me that classification could be made to reinforce the framework of our service and prevent the whole from collapsing into a formless and undirected tangle."

GRACE O. KELLEY

CONTENTS

PAGES

CONTENTS

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LECTURE 1

PRELIMINARIES

1. Importance of the subject. 2. Aim of Library Classification. 3. Five Laws of Library Science. 4. The Term Principles 5. The Term Classification 6. A brief history

IMPORTANCE OF THE SUBJECT

Dear Friends,

I am grateful to the University of Bombay for inviting me to deliver a course of lectures to you on the principles of library classification with special reference to Colon and Decimal Classifications. I deem it a great pleasure and delight to meet you here for the purpose

'Principles of Classification' is a subject of primary importance for librarians It forms the basis for the classification of books and other resources In libraries Modern schemes of book classification have, as far as possible, followed the line of thought covered in the general principles of knowledge classification laid down by great philosophers and logicians like Plato, Aristotle, Porphyry Conrad Gesner, Francis Bacon, and others and also the special principles of library classification enunciated by leading pioneers of,

library science like W C Berwick Sayers E. C Richardson, Henry Evelyn Bliss and S R. Ranganathan, with variations here and there according to the methods followed and views held by the classificationists of the schemes concerned

A classifier before he begins to classify books must first learn these principles so that he may be able to decide which scheme of classification he should adopt and how he should use it with a view to effect maximum help to readers in their approach for books in the library

Regarding the importance and the value of the subject, experts and veterans like W C Berwick Sayers Dr S R Ranganathan and Henry Evelyn Bliss have observed thus—

In the words of Sayers,— The foundation of the library is the book the foundation of librarianship is classification Without classification no librarian can build up a systematic library (one, that is to say, which represents adequately the field of human learning as it is recorded in books At any rate, libraries arranged upon the open access system are impossible to work without adequate shelf classification Readers would be lost hopelessly in an unclassified welter of books "[1]

According to Dr Ranganathan, "Library classification is the most profound and fundamental branch of

library science An acute and analytical brain great familiarity with the world of knowledge and books, and a severe and prolonged discipline are necessary to gain mastery of library classification This is a subject which bristles with difficulties which has many unsolved problems, and which will call for a complete burning of boat and starting afresh at least once in a century You will also find that it permeates every other branch of Library Science—nay every branch of thought and every walk of life."[2]

To quote Henry Evelyn Bliss —"Books differ in manifold diversity in matter and in manner in infinite variety and in complicated relations They retrace worn paths they blaze new trails they run wild over frequented fields or in regions hitherto unexplored they climb the heights they plumb the deeps they delve; they discover *bonanza* mines they take winged flight into the empyrean How can the librarian bring such wayward creatures into the bonds of organization? How shall he bind these intertwining vines to the trellis of classification?

"Yet this must be done, the librarian says and he knows The educator concurs for each study and every book must in some measure do this too—must classify, must organize its subject-matter And the

scientist agrees that data and subject matters must be classified, whether logicians and philosophers acquiesce or not for classification is the stock in trade of science There must be organization of knowledge thought and purpose It must be functional, but it must first be structural It should be as free as possible, as plastic and adaptive but it must not the less be coherent and stable else our whole scientific and educational undertaking would crumble in confusion [3]

AIM OF LIBRARY CLASSIFICATION

About the aim of library classification, Dr Ranganathan observes thus:—

"Library classification is not an end in itself It is only a means to an end The end sought is the furtherance and facilitation of the use of books To help Every Reader to find His Book, to find Its Reader for Every Book and to Save The Time Of The Reader And Of The Staff—this is what is aimed at in a library this is what is demanded by the Laws of Library Science; and this is what has, therefore, to be achieved by library technique Various are the means employed to achieve this end–open access shelf-guides library catalogue and so on One of such means is to arrange the books in a helpful order this is fundamental and the

efficiency of most of the other means, including the vital one of reference service depends on it. The arrangement has to be maintained with ease no matter what new books are added from time to time and how readers disturb the books while browsing amidst them. (The art of fixing and maintaining the preferred order is based on the science of Library Classification)"[4]

Prof John Dewey, the great contemporary American philosopher and educationist, observes, on the classification of books in libraries, thus—

" (a library is not a mere depository of books .a merely arbitrary classification does not satisfy even the practical needs) A classification of books to be effective on the practical side must correspond to the relationships of subject-matter) and this correspondence can be secured only as the intellectual, or conceptual organization is based upon the order inherent in the fields of knowledge, which in turn mirrors the order of nature (The library serves a practical end but it serves it best when practical tools and instrumentalities agree with the intrinsic logic of subjects which corresponds to natural realities.) The right organization of knowledge in libraries embodies, moreover a record of attained unification of knowledge and experience while it also provides an indispensable means to the development of further knowledge.

'Knowledge grows by specialised piece-meal increments, but unless the special worker is to become unaware of the relations and the meaning of what he is doing—*unless in the end chaos is to result*, there must be a central order based on comprehensive and unifying principles Yet the order must be sufficiently flexible to adapt itself to new and unforeseen growths [5]

FIVE LAWS OF LIBRARY SCIENCE

Let us now turn our attention to the effect of the advent of the Five Laws of Library Science on the management of libraries in general and on the improvement of the methods of classification in particular

'Making Books Work', is the motto of the librarians, today [1] To achieve this aim, they have introduced various techniques in the working of their libraries These techniques are -(1) Open access, (2) Classified arrangement (3) Stack-room-guides, (4) Classified catalogue (5) Reference service, and (6) Publicity methods. Unless readers are given direct access to shelves, it is impossible to satisfy the First Law of Library Science, *viz.* Books Are For Use, The Second and the Third Laws, *viz.* Every Reader His Book, and Every Book Its Reader, go a step further and observe

that even in an open access library, the chances for showing Every Reader His Book and finding a Reader for Every Book can be made or marred by the principle adopted for the arrangement of books in the shelves. It pleads that the arrangement by subjects has to be preferred to arrangement by author or by any other factor, as ordinarily, it is not the size of the book or its author that determines the kind of person that will use it. It is its subject matter. Hence for the sake of giving a reasonable chance for the books to find their readers, it is quite essential to arrange them in the shelves on the basis of their subject-matter

The Fourth Law, *viz* Save The Time Of The Reader, has an equal interest in reforming the shelf arrangement A reader interested in a specific subject, such as, ' Atomic physics or ' Thermodynamics ' will have to run through a large number of shelves to find out the books he wants, if the library is arranged alpha betically by the names of the authors On the contrary if it is arranged according to the subject-matter, he will find all the books, on the subject of his interest, arranged together in the shelf This has led the Fourth Law to press the claims of the classified mode of arrangement

The Fifth Law stipulates that ' A Library Is A Growing Organism " and as knowledge itself is

growing, it is necessary that the classification must be comprehensive embracing all past and present knowledge and allowing places for any possible additions to knowledge.

"Indeed this has been set down by Sayers as the first Canon of classification which reads thus :—

'A classification must be elastic expansible, and hospitable in the highest degree. That is to say, it must be so constructed that any new subject may be inserted into it without dislocating its sequence.

In addition to the scheme of classes being comprehensive and hospitable, the notation attached to them should be perfectly flexible. That is to say, it should permit the insertion of new subjects without any dislocation of the older classes."[6]

THE TERM PRINCIPLES

The term 'Principles' is derived from the Latin term *Principium* which *means the beginning or* the first source of anything. 'Principles' are defined by Henry Evelyn Bliss as 'generalisations of constant relations or conformities in action, processes and methods.

The book, *ot- the Five Laws of Library Science* of Dr Ranganathan expounds the five 'Principles' of

library science.

They are the generalisations or fundamental statements of the essential factors of library science The *Laws* are stated thus :—

(1) Books are for use
(2) Every book its reader
(3) Every reader his book
(4) Save the time of the reader
and
(5) Library is a growing organism

These *Laws* give us in a compact manner a general idea about the field and scope of library science It is on these *Laws* that the actions processes and methods of library science are based

The term *Law* ' is defined by E C. Richardson thus :—

" A *Law* is simply the way in which things are in the habit of acting. It may be defined as the like action of like things under like circumstances Any given law is simply the historical fact that certain things under certain circumstances act in a certain way The idea of law is that things having always acted in this way may be expected to act in this way in the future, although there is no guarantee of this because some other *Law* may come in to modify "[7]

The chief principles or laws which have to be taken into account in classification are mentioned by Richardson, thus :—

(1) The law of likeness
(2) The historical law and
(3) The law of evolution.

The terms (1) Laws (2) Criterion, (3) Canons (4) Tests and (5) Rules are synonyms of the term 'Principles'

It was W C Berwick Sayers who invented the phrase Canons of Classification Dr Ranganathan has also used this term in his *Prolegomena to Library Classification* and in it, he has introduced the phrase "a set of tests meaning *Canons* or *Principles* In his "*Librarians glossary*", L M Harrod defines the phrase 'Principles of Classification' as 'the rules formulated by logicians and classifiers by which a scheme of classification is made ' Dr Ranganathan observes about these *Principles* thus :—

"To appreciate the strength and weakness of a scheme of classification to compare the relative merits of two or more schemes and to do the day-to-day work of classification in a library consistently and in conformity to the chosen scheme, it is necessary and helpful to enunciate *a set of tests* and to lay down some systematic procedure "

THE TERM 'CLASSIFICATION'

The term 'classification' is derived from the Latin term *classis* a term used in ancient Rome to distinguish any of the six orders or classes into which the people were grouped according to their wealth and importance.

Bliss defines the terms (1) classification, (2) to class and (3) to classify thus –

"(1) The verb *to class* denotes likening, referring or assigning a thing to some class or several things to their respective classes as may be requisite or relevant to interests involved.. (2) The verb *classify* means primarily to make, or *conceive*, a class or classes from a plurality of things, and secondarily to arrange classes in some order or to relate them in some system according to some principle or conception, purpose or interest

In the primary sense, to classify implies that *certain things* are likened to form the nucleus of a class and furthermore that other things so likened subseqently are referred to, or assigned to, the class.

" In the secondary sense, to classify implies both that things are classed and that classes are formed or conceived but it adds moreover that the classes are arranged or systemized *Classifying* as participle and

as verbal noun, accordingly serves both in the primary and in the secondary sense

"(3) A classification is a series or system of classes arranged in some order according to some principle or conception, purpose or interest, or some combination of such The term is applied to the arrangement either of the class-names, or of the things, real or conceptual that are so classified The term *Classification* is also used for the classifying or arranging of classes, or things, as a process or method"

W Howard Phillips, in his *A Primer of book classification*, defines the terms (1) Classification (2) Groups, and (3) Divisions thus :-

"The term *classification* applies to the process of arranging *individuals* into groups according to their degrees of likeness, and combining these groups into still larger groups The process is completed when a single all embracing group which contains all individuals is reached The term *division* refers to the reverse procedure Here a single group is subdivided according to some quality possessed or not possessed by some of the individuals it contains The sub-groups thus obtained may be further subdivided in the same way until further division is impossible or unnecessary

"Generally speaking, both these processes are referred to as classification and it is said that

classification is a separating as well as a grouping process, it collects like things and separates unlike things ' [10]

In short, to classify things means to arrange them in classes A class of things means a group of things having some particular resemblance or likeness to one another We can sort things into classes on any principle (or in relation to any characteristic) we please to serve the purpose we have in view That is to say we can arrange them in such a way as is *ultimately useful for our purpose.*

A library which contains books on various branches of human knowledge and whose aim is to satisfy the *Five Laws of Library Science,* necessarily requires a sound classification of these books The principles of classification centre round the idea that books in libraries are to be arranged in a helpful order The arrangement has to be maintained with ease no *matter what new books are added from time to time* or how readers disturb the books while browsing amidst them

The art of fixing and maintaining the *preferred* order is based on the science of library classification The basic assumption of this science is the subject approach which is the most popular approach in library classification as it is experienced that readers almost

invariably consider books in a library from the point of view of their subjects

A BRIEF HISTORY

Till the third quarter of the 19th century, the classification of books, in the sense, in which we consider it now was not properly attended to, in libraries as the growth of literature and spread of knowledge were comparatively very slow till then But as their flow went on increasing gradually, a keen necessity was felt to improve the methods of classification followed in libraries But the notational barrier stood in the way of any further improvement

Dr Ranganathan has recognised and described lucidly seven *landmarks* in the progress of the science of library classification in his *Library Classification Fundamentals and Procedure* " "

FIRST LANDMARK

" The first landmark was the separation of the finding out of the specific subjects of books and that of mechanising their arrangement without the need for *ab-initio* determination on each subsequent occasion. The device that emerged from this first act of separation was the TRANSLATION of specific subjects into ORDINAL NUMBERS

SECOND LANDMARK

"Dewey forged this device as an act of intuition *but did not exploit its possibilities fully* as it was not objectively recognised and pursued The Colon Classification filled up this gap As stated in the *Prolegomena to Library Classification* (Pp 191-195) its success turned on the enormous freedom gained by SEPARATING ORDINAL AND CARDINAL NUMBERS and making the former declare independence of the latter and live to the fullest height of their suppleness This is the second landmrak.

THIRD LANDMARK

"A device which has proved most useful is the use of DEMICAL FRACTION NOTATION instead of that of Decimal Integer Notation This also we owe to the genius of Dewey The adoption of this, he invented because he could see the difference between showing a new subject somewhere and finding for it the right filiatory place among those already in existence This recognition again was by sheer intuition and is the third landmark.

FOURTH LANDMARK

'But the Decimal Fraction Notation proved inadequate to achieve fully all that is implied in the recognition of the difference mentioned above It had already become necessary to evolve a set of canons to

guide a critical scrutiny of schemes of classification Such canons may also, if sharp enough, help those who design schemes of classification W C Berwick Sayers stepped in here and paved the way for an objective analysis of the intuitive achievements of Dewey He developed a set of Canons of Classification and isolated several of them and among them was the Canon of Hospitality This is the fourth landmark Bliss too added his own quota at this stage.

FIFTH LANDMARK

"*The Prolegomena to Library Classification* pursued this process of isolating canons still further By analysing objectively what had been done intuitively by the Colon Classification, it discovered that the Hospitality' isolated by Sayers and provided for by Dewey was a treacherous compound—not an element. It divided it into its ultimates. Hospitality in Array' and Hospitality in Chain' It further found that the device of Decimal Fraction Notation used by Dewey met only the needs of Hospitality in Chain To provide for Hospitality in Array quite independently without its identity being lost by coalescence with the other, it found that the Colon Classification had brushed up and given full scope to the OCTAVE PRINCIPLE (See *Prolegomena to Library Classification* Pp 100-101). This step is Divide and Rule is the fifth landmark

SIXTH LANDMARK

"The Decimal Fraction Notation proved inadequate in another way A class may subdivide itself along several lines—on the basis of different trains of characteristics. Dewey had seen this He had 'divided and his schedules often contain in one and the same array classes derived by different trains of characteristics But he could not 'rule' them This may be put in another way (His mental microtome dissected and separated the different sections (trains of characteristics); they were mounted on separate slides and stained but in this process the original was permanently dismembered)

This can be illustrated thus—

A subject like 'Manure for potatoes will get as its class number either 631.8 which simply means 'Manure' or 633 491 which again simply means Potato crop' But the scheme is unable to show both the Facets or Sections of the subject viz., the Facet of Potato Crop' and that of Manure in the class number This is what is meant by dismembering the original i e. Potato crop in this instance permanently If the class number 631.8 (Manure) is fixed for the subject, it would naturally mean dismembering 'Potato

'He could not find any means by which the sections could be re-assembled and the original revived with all the inherent power of the parts and the whole to grow in their respective ways It is just this that the Colon Device has managed to do intuitively"

Taking the same illustration, we can prove this statement thus :-J321:2 is the Colon Class Number for "Manure for potatoes ', in which

J	is the Main Class Agriculture
321	is Potato Crop
:	indicates change of facet
2	is Manure

Thus the connecting symbol ( ) invented by Dr Ranganathan is able to fuse the two facets together

In his book, *Library Classification Fundamentals and Procedure* Dr Ranganathan, " has objectively analysed this problem The process taken upto the point reached by Dewey (his 'Divide without Rule) has been called Facet Analysis To stain the Facets so to speak, in a differential way, and allow them all to be assembled together so as to form the unmaimed whole and even get them distinctively displayed in the class numbers is the achievement of the Colon Device This is the sixth landmark in overcoming difficulties The Auto-Bias Device makes

the Rule prevail effectively even within one and the same Facet.

SEVENTH LANDMARK

To divide books into those that are seminal and unanalysable and those that are not, has been an important problem The 'Rule' that should follow this 'Divide' requires that all the auxiliary literature that usually grows round a 'Classic' should be clustered round it Classification should mechanise such a clustering arrangement for a classic and its growing family of literature The Colon Classification managed to effect Rule' in this matter by its Classic Device. This is the seventh landmark which redeems classification to some extent from the reproach of overlooking imponderable, vital, distinctive qualities "

Now let us have a passing reference to the different types of classification and the standard schemes of classification so far recognised

TYPES OF CLASSIFICATION

L. Montague Harrod has defined different types of classification in his The *Librarians Glossary*, thus:—

(1) Knowledge Classifications:—

"A classification used for any branch of knowledge, but which cannot be adopted for classifying books

until a generalia class, form classes and divisions, a notation and an index have been added "

(2) Book Classification:-

" A general term covering Bibliographical Classification and Bibliothecal Classification "

(3) Bibliographical Classification —

" One designed for the classification of books and other literary material, and for the entries in bibliographies and catalogues. "

(4) Bibliothecal Classification:—

' A classificaion scheme for the arrangement of books on the shelves of a library "

The term ' Library Classification ' is synonymous with the terms ' Book Classification ' Bibliographical Classification , and ' Bibliothecal Classification To apply knowledge Classification to Library Classification we require *generalia class, form classes, a notation* and an *index.*

STANDARD SCHEMES OF CLASSIFICATION

The standard schemes of classification as recognised so far, are the following -

(1) Dewey (Melvil) *Decimal Classification* 1876

(2) Cutter (Charles Ammi) *Expansive Classification* 1897

(3) Brown (James Duff). *Subject Classification* 1906

(4) *Library of Congress Classification* (U.S.A.). 1910

(5) *Classification Decimale Universelle (Brussels)* 1927

(6) Ranganathan (Shiyali Ramabhadra) *Colon Classification* 1933

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In our next discourse we shall acquaint ourselves with the Colon Classification—its author and its layout

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LECTURE 2

COLON CLASSIFICATION

(The author and the layout of the scheme)

1 The author 2. The layout. 3. Notation. 4. Helpful order 5. Common subdivisions and other auxiliary tables.

In our last discourse we touched upon various points pertaining to the principles of classification in a general way, while surveying the whole field of classification While doing so, we saw that the principle of *Likeness* and the principle of *Hospitality* play a prominent part in classification We also touched upon the meaning of the terms *viz.* (1) Principles (2) Classification, (3) Groups, (4) Divisions, (5) Different Types of Classification, and (6) The Standard Schemes of Classification

We have seen that the basic assumption of the science of library classification is the *subject approach* which is the most popular approach in libraries

We shall develop today our familiarity with the Colon Classification—its author and its layout.

THE AUTHOR

Dr Ranganathan, the author of the Colon Scheme is decidedly the Father of Library Science in India and is responsible, to a large extent, in making India Library-conscious His works cover every field of library science and his reputation as the foremost expert and authority on the subjet extends far beyond the borders of our country and his opinion and advice are valued in all lands where books and libraries are held in honour The monumental works, he has written on all branches of library science and the various devices in classification evolved by him in developing the Colon Classification have secured for him a prominent place in the history of library science

He experimented all his devices and methods and brought them to considerable perfection in the Madras University Library during the course of his splendid career of 21 years in that library (During the years 1945 and 1946, he reorganised and reclassified the valuable resources of the Benares Hindu University Library according to his Colon Scheme at the invitation of Dr Sir S Radhakrishnan, the then Vice-Chancellor of that university)

Since the year 1947 he has been occupying the dignified post of the First Professor of Library Science and Head of the Department of Library Science in the

University of Delhi and has been conducting there a degree course in library science–the first of its kind in our Commonwealth. Referring to this degree course in his Foreword to Dr Ranganathan s recent book, *viz Preface to Library Science*, published by the University of Delhi Sir Maurice Gwyer the then Vice-Chancellor of that University observes thus—

" It is a very great satisfaction to me that Delhi *University is the first University in India to institute* a degree in library science, following in this, the example of some of the great universities in America

On the 7th March 1948 the University of Delhi conferred upon him the Honorary Degree of the Doctor of Letters along with distinguished leaders of our nation like the Hon Prime Minister Pandit Javaharlal Nehru and the Hon Minister of Education Maulana Abul Kalam Azad

He was mainly responsible for bringing into existence the Indian Library Association and the different library organisations and associations that are trying to make the people more and more library-conscious derive their inspiration from him

In June 1948, *he* visited the United Kingdom on the special invitation of the British Concil as their guest He, then had the opportunity of addressing the

conference of the International Federation of Documentation at the Hague He visited France, Denmark, Sweden and Norway and also the U S A. and was asked to deliver talks on his classification scheme and other techniques of librarianship that he has devised and developed His talks had a good reception in the press and those who have read his books told him that they had read most of his books and that they cover such a vast range and they wanted to know from him about the source from which all his ideas sprang forth He was invited by the United Nations to serve on the International Advisory Committee of Library experts Seven nations were represented The Columbia University and the Library of Congress had him as their guest during his stay in the U S A and he was the recipient of many receptions and delivered public addresses before a large audiance He lectured on (1) the Philosophy of Public Librarianship and (2) Systematic and Technical Processes in classification and Cataloguing at the Unesco s First International Summer School of Librarianship held at the Ashburne Hall in Manchester and the University College, London The school was attended by librarians from 25 nations Mr William B Paton Head of the Scottish School of Librarianship, Glasgow in his most stimulating interesting and instructive article on the Summer School, observes

thus — ' and Dr Ranganathan whose quaint turn of phrase and picturesque fresh outlook on library problems provided a valuable stimulus in lecture room and discussion '

Mr Charles Nowell President of the British Library Association while introducing the members of the International Library Committee to the members of the Council of the British Library Association at the Chaucer House in London observed — They have had quite a number of lectures and discussions in Manchester, but the charm of lecturers like Dr Ranganathan, who in addition to being very able is also picturesque will enable them to maintain their interest during the next 8 or 10 days."[2]

The editor of the "Library World" in the issue of the journal for Oct. 1948 observed about Dr Ranganathan thus—

"We have mentioned again the name of S R. Ranganathan who is the guest of this country at the time we write. He has, in the past month taken part in a conference at the Hague has been to Lake Success addressed gatherings at the Library of Congress, lectured to the London and Home Countries Branch of the L. A given an address on Self-perpetuating classification to the Society of Visiting Scientists and Aslib and has taken the chair at several of the recent conference meetings

Ranganathan is a quite important figure in Indian, and even in world librarianship his activity is prodigious and is inspired by a faith in libraries which is infectious and at times almost frightening. In the past year he has written five books and he shows no signs of weariness or even slackening [5]

We are, indeed very proud to have a great genius like Rao Saheb Dr Ranganathan who is decidedly acknowledged as our foremost leader and guide in our library movement (Under his guidance we shall raise the standard of service in our libraries and then the status of the librarians in our land will also be automatically raised)

The basic principle that is to be observed in devising a scheme of classification, the purpose of the classification of books and the denotation of class numbers are put in a nut-shell by Dr Ranganathan thus:--

("Books in a library can be used to the maximum possible extent only if they are arranged on the shelves in a classified order according to their subject matter) This is because in a majority of cases it is the subject approach to books that recurs A reader usually wants some book or all the books on a specific topic. His wants can be satisfied without loss of time and without undue strain on the memory of the staff if, and only if,

all the books on the required topic are kept together on the shelf and the position of the topic among thousands of others is the most filiatory one Moreover, the task of finding this positon when the books have to be reshelved should not involve studying the book again in order to determine its filiatory place *ab initio*, but should be rendered mechanical. To secure this result books in a library are classified by a scheme of classification which is fitted with a notation, which expresses the subject-matter of a book in terms of ordinal numbers—class numbers as they are called—according to a well-tried standard schedule In effect, class numbers constitute an artificial language designed to secure filiatory order among topics and to mechanise their arrangement "¹

THE LAYOUT

We shall now describe the general outline or lay out of the Colon Scheme

The Colon Classification has been acclaimed throughout the world as an original and scholarly contribution to library science and as such it deserves close study by the students of library profession in general and by the students of that profession in India in paticular

B J Palmer observes about this scheme thus :—

' Colon represents the approach of a trained scientific mind to the problems of classification It was

created with the background of classificatory thought of two generations, and having in view the practical requirements of the working librarian Recognising that all existing schemes bore within themselves the seeds of decay, since they represented the scientific consensus of the period in which they were conceived, Ranganathan attempted to produce a scheme which was as far as possible timeless. He recognised that in one science at least chemistry an artificial language had been created for stating unequivocally the constituents of its materials and he sought to provide just such an artificial language for classifiers to use To a certain extent existing schemes were doing this but at best they could not provide a select list for past and present ideas, and attempt to anticipate future developments. Consequently, classifiers continually found themselves in the position of travellers in a foreign land armed only with a phrase book This phrase book met all the ordinary situations of life but failed when the conversation rose above the bread and butter level. At this stage the traveller must acquire a dictionary and a knowledge of grammar and syntax Ranganathan s scheme is an attempt to provide these for the classifier Colon lists only fundamental constituent terms whereas the other schemes attempt to list derived composite terms [23]

HOW THE SCHEME WAS DEVISED ?

The story of how the scheme was devised by him

will be found interesting and hence let us probe into it a little while

During the year 1924-25 Ranganathan was in England for prosecuting his studies in library science. He, then, had the opportunity of closely studying the four important schemes of classification, *viz.*

(1) Melvil Dewey's Decimal Classification 1876,

(2) C A Cutter's Expansive Classification 1891,

(3) The Classification of the Library of Congress (Washington), 1904, and

(4) James Duff Brown's Subject Classification 1906

under the guidance of W C Berwick Sayers one of the leading authorities on the subject

His study revealed to him that none of these schemes was of any practical use for classifying new resources of libraries, apart from their unsuitability to books on Indology He then, conceived the idea of devising a scheme of classification of his own He realised how difficult was the task before him He had also entered into correspondence with the author of the Decimal Scheme, the late Dr Melvil Dewey who advised him not to waste his time and energy in either improving upon a tried scheme of clas ^

created with the background of classificatory thought of two generations, and having in view the practical requirements of the working librarian Recognising that all existing schemes bore within themselves the seeds of decay, since they represented the scientific consensus of the period in which they were conceived, Ranganathan attempted to produce a scheme which was as far as possible timeless He recognised that in one science at least chemistry an artificial language had been created for stating unequivocally the constituents of its materials and he sought to provide just such an artificial language for classifiers to use To a certain extent existing schemes were doing this but at best they could not provide a select list for past and present ideas, and attempt to anticipate future developments Consequently, classifiers continually found themselves in the position of travellers in a foreign land armed only with a phrase book. This phrase book met all the ordinary situations of life but failed when the conversation rose above the bread and butter level. At this stage the traveller must acquire a dictionary and a knowledge of grammar and syntax Ranganathan s scheme is an attempt to provide these for the classifier Colon lists only fundamental constituent terms, whereas the other schemes attempt to list derived composite terms "3

HOW THE SCHEME WAS DEVISED?

The story of how the scheme was devised by him

number of the D C. consists of 3 digits while that of the C C consists of only one digit. The D C has used Arabic Numerals as decimals and in usual practice every class number of it consists uniformly of at least three digits e. g Science (General) gets 500 as its class number and not merely 5, Mathematics is indicated by the three digits 510 instead of by the two specific digits though the last digit does not carry any special meaning It is gratifying to note that the U D C. has recommended the omission of these functionless zeroes. The notation of the D C is purely of Arabic numerals and hence Dewey could not have more than 10 Main Classes for his scheme.

Dr Ranganathan after giving due thought to the great advancement of human knowledge since the year 1876 when the D C was born decided to have a sufficiently large base for the main classes of his scheme He, therefore, adopted a mixed notation for his scheme, which consists of 10 Arabic numerals, capital and small letters of the Roman alphabet, a delta a colon a dot and a dash The Generalia Class represents all its main divisions by Arabic numerals while all other main classes get capital letters of the Roman alphabet as their class numbers, excepting the class of Spiritual Experience and Mysticism, which gets

(delta) as its class mark The whole schedule of the Main Classes of the C C reads thus—

THE MAIN CLASSES

1 to 9 Generalia	Δ Spiritual Experience and Mysticism
SCIENCES	HUMANITIES
A Science (General)	N Fine Arts
B Mathematics	O Literature
C Physics	P Linguistics
D Engineering	Q Religion
E Chemistry	R Philosophy
F Technology	S Psychology
G Natural Science (General) and Biology	T Education U Geography
H Geology	V History
I Botany	W Political Science
J Agriculture	X Economics
K Zoology	Y (Other) Social Sciences including Sociology
L Medicine	
M (Other) Applications of Sciences Useful Arts	Z Law

The useful grouping of the Main Classes as seen in the schedule, may be shown, thus —

1 to 9 Generalia

TOOL SUBJECTS

A	Science (General)
B	Mathematics

PHYSICAL SCIENCES AND THEIR APPLICATIONS

C	Physics
D	Engineering
E	Chemistry
F	Technology

BIOLOGICAL SCIENCES AND THEIR APPLICATIONS

G	Natural Science (General) and Biology
H	Geology
I	Botany
J	Agriculture
K	Zoology
L	Medicine

USEFUL ARTS

M	(Other) Applications of Sciences Useful Arts

SPIRITUAL EXPERIENCE AND MYSTICISM

Δ	Spiritual Experience and Mysticism

HUMANITIES

N	Fine Arts
O	Literature

(delta) as its class mark The whole schedule of the Main Classes of the C C reads thus—

THE MAIN CLASSES

1 to 9 Generalia

△ Spiritual Experience and Mysticism

SCIENCES	HUMANITIES
A Science (General)	N Fine Arts
B Mathematics	O Literature
C Physics	P Linguistics
D Engineering	Q Religion
E Chemistry	R Philosophy
F Technology	S Psychology
G Natural Science (General) and Biology	T Education
	U Geography
H Geology	V History
I Botany	W Political Science
J Agriculture	X Economics
K Zoology	Y (Other) Social Sciences including Sociology
L Medicine	
M (Other) Applications of Sciences Useful Arts	Z Law

The useful grouping of the Main Classes as seen in the schedule may be shown, thus —

1 to 9 Generalia

The letter A is assigned to Science (General) Then follows B Mathematics, which is the queen of sciences as remarked by the great German mathematician Karl Friedrick Gauss It is the purest of *pure* sciences and is used as a tool in most of the other subjects *Henry Evelyn Bliss defines Mathematics as a method* of treating the relations of sciences abstractly and more especially their numerical and spatial relations Dr Ranganathan would call mathematics the servant of all sciences He observes thus-" It would be a good vacation exercise for certain types of students to explore the extent to which Mathematics has aided other subjects The reciprocal theme of the extent to which the development of Mathematics has been due to other subjects will be equally interesting

C to F constitute Physical Sciences C is assigned to Physics ' which uses Mathematics to elucidate the general (as distinguished from the specific) properties of matter and energy Physics is the most general of all the sciences general both in scope in treatment, in principles and in methods It is, therefore, termed a fundamental science which supplies principles and methods to other physical sciences. Then follows D Engineering which applies B Mathematics and C physics so largely

Then comes E Chemistry which deals with the specific properties of substances (as distinguished from

undifferentiated matter which is the province of C Physics) Chemistry was formerly regarded as a fundamental science, but though equally general in scope and application it is really but an extension of physical science to the more special data and actions of chemical changes This Class is followed by its applications, F Technology

Natural Sciences are represented by the Classes G – L

G stands for the comprehensive and residual Class of Natural Science. It includes Biology, the science of life as such (apart from the specific properties of plants, animals and the human body)

' In an extended sense, all the sciences that follow Biology in the Series of Gradation by Speciality are biological in that they depend in certain relations on the fundamental science, Biology and they are extensions into the development and activities of life In that series of gradation by speciality, Biology is the third fundamental science, Physics and Chemistry being the first and the second It is more special in that life and living beings are more special than matter and natural objects, trees, clouds mountains winds etc [6]

Now we come to H Geology It " deals with the vestiges of old and extinct forms of life, and with the

Earth the scene of life Coming to contemporary forms, we begin with the simpler vegetable life in I Botany and pass on to its applications in J Agriculture Then comes the study of animal life under K Zoology Last in this series of natural sciences comes L Medicine which deals with the living body of man—[its anatomy physiology diseases and growth cure of diseases surgery, pharmocognacy or the science of drugs public health hygiene—every thing in short concerning human body]

At the head of all the Sciences—pure, physical and natural—comes the comprehensive and residual class A Science (General) while the sequence is completed by M Useful Arts which comprise all the applications of science not provided already in the sequence and Recreative Arts. "

Thus we see that the first half of the schedule of the main class is well collocated i e the closely related subjects are placed in proximity and the grouping is well effected

Thus:—

(1) A Science (General) and B Mathematics form the first group

(2) C Physics followed by its applications in D Engineering and E Chemistry followed by its

applications in F Technology form the second group

(3) G Natural Science including 'Biology, H Geology, I Botany with its applications in J Agriculture and K Zoology followed by its applications in L Medicine, represent the third group amongst the panel of the science half of the Schedule

(4) M Useful Arts comprising all the applications of Sciences not provided for in the sequence and Recreative Arts form the last link of the Science half of the Schedule of the Main Classes

"The order in the Humanities' half of the Array is not so natural as the order in the Science half But still it cannot be said to flout the Canon of Helpful Order altogether

' For we begin with N Fine Arts then pass on to Fine Arts *par excellence* O Literature, which leads us to philology, the science of language, the canvas so to speak of the art-form literature,

In justification of Q Religion s position next to P philology, we might quote the common saying of Indian devotees that the best use of man s power of speech is in praise of God After the subsiding of the first fervour of religion man begins to enquire about the reality or otherwise of God himself and other

creations and so builds up R Philosophy This involved use of the mind, the study of which is S Psychology This is followed by its important application in the training of the mind of the young T Education

" The six Classes N–S may be called Humanities proper

' The six classes U – Z may be called Social Sciences which is the other half of the Humanities (General).

' T may be classed with either half of the Humanities '

U stands for Geography which deals with the study of the surface of the earth, the support of Human Society

' Then comes the concrete account of the life of humanity on Earth in the past and the present which is V History From the concrete data furnished by History, we distil the pure essence (unconditioned by space and time) of Political Science which is represented by W Political Science, in the last analysis, is conditioned by man s economic needs and so the next subject is X Economics The political organisation and the economic arrangement will become futile unless there is Law and Order This is Z. The comprehensive residual class Social Sciences (General)

has been put down as Y It would have been wiser if Y represented Law and Z Social Sciences (General) n7

Thus we see that the panel of the Humanities and the Social Sciences half is also collocated with closely related classes

The grouping of these classes can be shown thus.

(1) N Fine Arts and O Literary Arts or Literature with P Linguistics form one group

(2) Q Religion with R Philosophy represent the second group and

(3) S Psychology and T Education make the third and the last group of Humanities

The classes viz U Geography V History, W Politics X Economics Y Other Social Sciences and Z Law together form the group of the Social Sciences which is the last group in the Schedule

SPIRITUAL EXPERIENCE AND MYSTICISM

Regarding the connotation of the Main Class Spiritual Experience and Mysticism the a ... observed thus —

" It is possible for any class of ... presented from an occult or mystical ...

To call such an exposition ... violate the Canon of Reticence, for

and irrational ' refer to the plane of intellection whereas mystic occult or spiritual experiences do not belong to the sphere of intellectual apprehension at all but are said to involve some kind of direct (trans-intellectual) insight

" Little no doubt is generally known about the nature or modes of such mystical apprehension and its validity and even existence are often questioned But it is not for the classifier to take sides in a controversy He is simply concerned to separate literature based on sense-experience and intellection from that presuming or using trans-intellectual apprehension In India such a distinction is traditionally recognised, Exposition based on intellection is called *kartrtantra* (experimental analytical study of things in their phenominal modes) and *vastutantra* (global, holistic study of thing-in-itself) is exposition based on illumination

" The Main Class Δ is to hold the latter Since the Arabic numerals and the Roman alphabet had already been exhausted the new symbol had to be found for this new Main Class.

The Δ of age-long mystical significance naturally suggested itself to the author Its standing outside the formal series of the other symbols fittingly represents the irresoluble nature of all it stands for

'All ordinary (non-mystical) expositions are accommodated in the Main Classes A to Z. A mystical, occult or spiritual exposition of any subject — say E Chemistry—is referred to the Main Class Δ —and individualised as ΔE In other words, Δ is to be amplified by the Subject Device to accommodate mystical exposition of specific subjects '[28]

NOTATION

We have seen that the schedule of the Main Classes consists of three species of symbols viz. (1) 10 Arabic numerals, (2) 26 Capital letters of the Roman alphabet and (3) a delta (Δ)

In addition to these three species the scheme has used nine more viz. (4) the 24 small letters (excluding i and o), of the Roman alphabet, (5) a forward arrow (→), (6) a backward arrow (←), (7) a slant stroke ( ), (8) a dot ( ), (9) a colon (:), (10) a semi colon ( ) (11) a comma ( ), and (12) a dash ( ) The connecting Symbols viz a forward arrow a backward arrow a slant stroke, a dot, a semi-colon and a comma are recently added to avoid certain pitfalls which appear while fixing the Facet-Formula of a subject so that the facets may fall in it in the Decreasing Order of Concreteness of the five fundamental elements, ' vi Time Space Energy Matter and

Personality, about which the author of the scheme observes thus: —

' Facet-analysis is one of the fundamental factors in library classification It is implicit, primitive and unrecognised in many of the schemes of classification It has been made explicit in the very notation of the Colon Classification The first rule for the classification of most of the main and canonical classes prescribes the facets from which all further stages in classificatory work should begin The procedure laid down in the *Library classification. Fundamentals and procedure* (Madras, 1944) implements facet-analysis and prescribes it for use even in the formulation of the name of the specific subject of a book or article or any other reading material The same book has gone further and reduced the facets themselves to the five fundamental elements:- Time, Space Energy, Matter and Personality ' [9]

The small letters of the Roman alphabet are assigned to Common subdivisions. Regarding the purpose and use of the remaining symbols we shall have discussion later on in the course of our discourses on the various Canons of Classification

The symbols used in constructing the Class Number shall be taken to fall in their ascending order of absolute magnitude thus – a b, c .x y z, o, –

+, / : ,',- 1 2, 3, 7, 8, 9, A, B C, M Δ N O X, Y, Z

Thus the notational base of this scheme has 69 symbols which gives a very wide scope for its divisions and expansion The necessity of keeping constantly a filiatory order of books and other literary resources in the shelves and the ever increasing complications in the branches of knowledge has compelled the author to adopt this mixed notation with various useful devices The author has tried his utmost to make the assignments of the notation to the different books as brief as possible without affecting the principle of coextensiveness *i e* the necessity of effecting a complete symbolic representation of the subject by assigning to it a distinctive class-mark so that the books on a specific subject may not be mixed up in an arbitrary way has been achieved in a wonderful manner in this scheme

COMMON SUBDIVISIONS AND AUXILIARY TABLES

The common subdivisions which occur in many classes are numbered *a* to *z* (small Roman letters) with decimal subdivisions where necessary The same common subdivision is always represented by the same symbol in all cases

In addition to the schedule of the Main Classes and that of the Common subdivisions there are four

auxiliary tables, *viz.* (1) a table of Geographical Divisions (2) a table of Language Divisions (3) a table of Chronological Divisions for the chronological expansion of a class number and (4) another table of Chronological Divisions for book-numbers to be assigned to books according to the dates of their publication

In our next discourse, we shall consider the method of constructing a class number as developed in this scheme

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LECTURE 3

METHOD OF SUBDIVISION

1. Method of constructing a class number 2. Method of translating a specific subject into the symbolic language of the classification scheme 3. Facet analysis. 4 Six propositions of library science.

Last time, we developed our familiarity with the author of the Colon Classification and the layout of the scheme We also considered the helpful order as is seen in the schedule of the Main Classes. We shall now see how the class numbers are constructed in this scheme

Regarding the method of subdivision as followed in this scheme the author observes thus –

The Colon Classification differs from Dewey's Decimal Classification and the volumes of Congress Classification in some fundamental respects It is their manifest aim to provide a ready-made class number for the most topics Hence, such manuals consist for the most part of the schedules of classification And their schedules are by several times larger than that of the Colon Classification

In the Colon Classification, however ready-made class numbers are not assigned to topics. The schedule in the Colon Classification may be said to consist of certain standard unit schedules The standard unit schedules correspond to the standard pieces in a Meccano apparatus

" Even a child knows, that, by combining these standard pieces in different ways, many different objects can be constructed So also, by combining the classes *in the different unit schedules in assigned* permutations and combinations, the class numbers for all possible topics can be constructed In this scheme the function of the Colon ( ) is like that of the bolts and nuts in a Meccano set

One natural result of this method of giving certain standard schedules, rather than ready-made class numbers for topics, is the extraordinary mnemonic quality that the scheme has acquired It has been felt in the libraries using this scheme that after a little experience the need for looking into the schedule becomes increasingly small and this is so even for specialised monographs requiring a long drawn out class number '

In the first part of the book the author has given a set of Rules for constructing the class numbers

with the aid of the unit schedules. The spirit of standardisation has greatly simplified the rules themselves

'Another feature of this scheme is the very great minuteness of classification in most of the subjects Even extremely specialised monographs get individualised in this scheme It is a matter of experience that such a detailed classification is quite necessary if all the resources of a library on every topic however great it's intension, are to be disclosed with the least expenditure of time

In addition to the great minuteness of its classes this scheme is much more hospitable than any other, owing chiefly to the Eight Devices," viz. (1) The Colon Device, (2) The Geographical Device, (3) The Chronological Device, (4) The Favoured Category Device (5) The Classic Device, (6) The Subject Device, (7) The Alphabetic Device and (8) The Bias-number Device

"Further, the notation being completely decin elasticity is quite commensurate with the hosp of the schedules The length of I proportionate to the intension thus the of a common text-book will be very sh

Topics in Indology have been far greater detail than in other sch

Indology are numerous not only in Indian libraries but also in many foreign libraries The Indological schedules will also be of use in classifying Oriental Manuscripts Libraries.

"An important respect in which the Colon Classification differs from other schemes is its ideal to individualise every topic This ideal it realises with a remarkably short notation "[1]

METHOD OF CONSTRUCTING A CLASS NUMBER

Now let us take an example to see how the class number is constructed in this scheme

Let us take

Fawcet (C B). A political geography of Europe 1933

The formula of characteristics for the Main Class *Geography* is written thus.—

U [P] [G] : [C]

In this formula

- U is the Main Class Geography
- P is Problem Characteristic
- : indicates change of Characteristic
- G is Geographical Division Characteristic
- : indicates change of Characteristic
- C is Chronological Division Characteristic

The rules regarding the use of these characteristics read thus —

UO Three trains of characteristics are to be used for the subdivision of Geography, *viz.*, Problem or 'P' Geographical or 'G and Chronological or C

UO1 The three trains of characteristics forming the basis of classification of Geography are to be taken in the order 'P , 'C', 'C

UO2 The numbers corresponding to these trains of characteristics may be termed the Problem Number, the Geographical Number, and the Chronological Number respectively

UO3 The symbols and the appropriate divisions on the basis of the train of Problem characteristics are given in Schedule U of Part II

The main divisions under the train of Problem Characteristic read thus—

1 Mathematical geography
2 Physical geography
3 Biogeography
4 Anthropogeography
5 Political geography
6 Economic geography
7 Travels expeditions, voyages

These divisions are arrived at according to the definitions of Geography as given in the big Oxford Dictionary named as New English Dictionary in 10 big volumes. The dictionary defines Geography thus –

"The Science which has for its object the description of the earth's surface, treating of its form and physical features, its natural and political divisions, the climate, productions, population, etc of the various countries

According to this definition the Colon Classification includes in the problem Divisions of Geography, Mathematical geography Physical geography, Biogeography, Anthropogeography and Economic geography It also includes the Science of Meteorology Another feature of the problem classes is that Travels forms one of them The general travel books are to be accommodated in this division

The divisions of Geographical and Chronological Characteristics are to be taken from the tables of Geographical and Chronological Divisions

The table of Geographical Divisions reads thus —

1 World
2 Mother country
3 Favoured country
4 Asia

5 Europe
6 Africa
7 America
8 Australia
9 Oceans

The Table of Chronological Divisions reads thus—

A Before 1999 B C
B 1999 to 1000 B C
:

M 1800 to 1899 A D
N 1900 to 1999 A D

and so on.

TRANSLATING A SPECIFIC SUBJECT

Now according to the *Formula* of Characteristics and the method of translating a specific subject into its appropriate class number as developed by the author in his *Library Classification Fundamentals and Procedure* the class number for the book can be arrived at, thus—

(0) Political geography of Europe 1933

(1) U
(2) U [P] : [G] [C]
(3) U [Problem number] : [Geograpical number] : [Chronological number]

(4) U [Political geography] : [of Europe] [1933]
(5) U [Political geography] : [Europe] : [193–]
(6) U5 : 5 : N3
(7) U is the Main Class Number
  5 is the Problem Number
  : indicates change of characteristic or facet
  5 is Geographical Number
  : indicates change of characteristic or facet
  N3 is the Chronological Number
(8) U = Geography
  U5 = Political geography
  U5:5:N = " " brought upto 1900's
  U5:5:N3 = " " " 1930's

which is virtually equivalent to the specific subject of the book

FACET ANALYSIS

Now we shall introduce the special terminology used by the author in his *Library Classification. Fundamentals and Procedure* and in all his further contributions on the subject

In the formula of characteristics, the characteristics shown are termed as Facets, Thus in the

present example the characteristics used for the subdivision of Geography, viz (1) Problem, (2) Geographical Division and (3) Chronological Division are the three facets or sections, and the divisions and subdivisions of these facets are termed Foci Dividing a facet is focusing a facet. The particular division or subdivision of a facet that figures or features in a class number is said to be the focus of that facet in the class number Thus in the present example the problem Division 5 Political Geography is the Focus of the Problem Facet in the class number under consideration Similarly the Geographical Division Number that modifies or develops the subject produced by the application of the first characteristic is said to be the Focus of the Geographical Division Facet featured in the class number In the same way when we come to the Chronological Division Number which has further modified or developed the class number is said to be the Focus of the Chronological Division Facet Thus the Formula fixed for the subdivision of Geography, viz U [P] : [G] [C] consists of three Facets, viz. (1) the Problem Facet (2) the Geographical Division Facet, and (3) the Chronological Division Facet, and the class number viz U5:5:N3 consists of the particular Focus of the three Facets that are featuring in the book viz. Political Geography of Europe brought upto 1930 .

The Decimal Classification Number for the book is 911 4 which can be interpreted thus:—

9 stands for the main class history
1 stands for geography
1 stands for political geography
is a punctuation mark which is written in the Decimal Classification after the first three digits of the class number
4 stands for Europe.

The class number of the Decimal Classification is not able to give the period upto which the account of the political geography of Europe is brought by the author Thus the class number of the Decimal Classification is not coextensive to the subject of the book

The subject of Geography is very much advanced in recent years At the time when Dewey prepared his schedules, Geography was considered as political and historical Geography But now it has widened its field and the problem divisions as shown by the Colon Classification have become specialised branches of Geography They require to be collocated as is done by the Colon scheme In the Decimal Classification we find these divisions put under various other classes to which they are originally related thus: —

(1) Mathematical Geography gets 525 Earth which is a subdivision under 520 Astronomy

(2) Physical Geography gets 551 as a subject included in ' Physical and dynamic geology '

(3) Biogeography goes under 574 physiologic and structural biology and gets 574 9 as its class number

(4) Anthropogeography is shown in the relative index as included under 910 which is the division under History assigned to Geography Travels and Description

The appropriate place for this division in the Decimal Classification is 572 Ethmology, Anthropology in general

(5) Political geography gets 911 which is designated as historical growth and changes in political division

(6) Economic geography deals with Trade routes and hence the sub-divisions of 380 Commerce of 385 Railroads, 386 waterways and 387 Ocean and air transport are appropriate placings for it

(7) Travels expeditions voyages are shown thus—

910 4 Circumnavigations ocean travels etc

910 9 History of geography travels and in addition material dealing with travels in particular areas and parts of the world may be classed under 914–919

Thus we see that the comprehensive class Geography is widely spread under different classes in the D C Hence the students of Geography cannot find all useful material on Geography brought together in the D C as is done in the Colon Classification

Part 2 Facet–Analysis, chapter 21 First step in translation of *the Library Classification. Fundametals and Procedure* deals with the method of translating a specific subject into Colon Number The steps of translation are given in the chapter thus —

(0) Write down the Name of the Specific Subject,

(1) Write down the Digit of the Main Class to which the specific subject belongs

(2) Write down the Formula of characteristics found at the head of the chapter devoted to the Main Class in Part 2 Schedules of Classification

(3) With the aid of the rules in the corresponding chapter of Part I Rules of Classification' re-write the formula with the symbols in the

formula duly expanded Let us call this the Expanded Formula

(4) Distribute the words in the name of the specific subject into appropriate brackets. Let us call this the Particular Expression of the Formula

(5) Referring to the rules whenever necessary, translate the words within the brackets into the standard terms given in the schedules of part 2, omitting all connecting words and puffs and supplying with the aid of the Canon of Context the words if any, required to make the contents of a bracket intelligible

(6) With the aid of the schedules translate the words within brackets into Numbers and remove the brackets The result is the Class Number (Colon Number)

To verify if the class number obtained is a correct translation of the specific subject, proceed further as follows.

(7) Analyse the class number into its constituent facets and give them the name shown in the rules of Classification

(8) with the aid of the appropriate schedule of classification, give a digit by digit interpretation of the class number

The speciality of this scheme is that any specific subject can be individualised and given an appropriate place in the arrangement of the subject To secure this facility the author has introduced a good number of devices which have helped the scheme to become exceptionally mnemonic.

The basic principle that is to be observed in devising a scheme of classification the purpose of the classification of books and the denotation of class numbers are put in a nut-shell by Dr Ranganathan thus.—

(Books in a library can be used to the maximum possible extent only if they are arranged on the shelves in a classified order according to their subject matter. This is because in a majority of cases it is the subject approach to books that recures A reader usually wants some book or all the books on a specific topic His wants can be satisfied without loss of time and without undue strain on the memory of the staff if nd only if, all the books on the required topic are ept together on the shelf and the position of the pic among thousands of others is the most filiatory

one Moreover the task of finding this position when the books have to be reshelved should not involve studying the book again in order to determine its filiatory place *ab initio*, but should be rendered mechanical To secure this result, books in a library are classified by a scheme of classification which is fitted with a notation, which expresses the subject matter of a book in terms of ordinal numbers-class numbers as they are called according to a well tried standard schedule In effect class numbers constitute an artificial language designed to secure filiatory order among topics and to mechanise their arrangement "1

V SIX PROPOSITIONS OF LIBRARY SCIENCE

This statement is put in the form of six propositions of the Science of Library Classification, by Dr Ranganathan thus.—

FIRST PROPOSITION

' Books should be arranged according to their specific subjects This means that all the books on a specific subject should be kept together without any book or any other specific subject intervening between them "

For example, let us take the Main Class Geography in this class

All bibliographies of geography should be kept together whoever be their author and whatever be their language or year of publication

Similarly, all periodical publications of Geography should be kept together whichever be the agency of their publication and whatever be their language or year of publication

So also, all the general treatises on Geography should be kept together whoever be their authors whatever be their language or year of publication .. and so on

SECOND PROPOSITION

" The result of the first propontion is that books would get grouped by their specific subjects There will therefore be obviously as many groups formed as there are specific subjects The problem that arises next is : In what order these groups be arranged ? In other words in what order should specific subjects be arranged among themselves ? The answer to the question is provided by the Secoud Proposition of the science of library classification which is stated thus:—

Specific subjects should be arranged among themselves in a filiatory order

'In a filiatory order' means in an order which respects the degree of mutual relation between the

specific subjects This is a very involved and profound concept It is difficult to define 'Filiatory order' in general terms The author has stated some principles by which we determine priority among any two subjects

Here are some of them —

PRINCIPLE 1

If one of the specific subjects is a subclass of the other the more extensive should have priority among any two specific subjects

Ex English Literature' should have priority over 'English poetry'

PRINCIPLE 2

If one of the specific subjects relates to an earlier period than the other, that which relates to the earlier period should have priority

Ex The Marathi poet Eknath should have priority over Tukaram as the former was born in 1533 while the latter was born in 1608

PRINCIPLE 3

If two specific subjects are genetically related, the earlier to evolve should have priority over the other

Ex. A critical book on Shakespeare's Hamlet depends for its existence on the earlier evolution of the play itself The latter should therefore have priority over the former

PRINCIPLE 4

If one of the specific subjects is more fundamental and abstract and the other is an application of it and is more concrete the former should have priority over the latter

Ex. Keshav Narayan Watve's *Rasa Vimarsa* should have priority over S K Kshirasagar's *Vyakti ani Vangmaya*, as the former s focus of attention is the Principles of Criticism of Marathi Literature while the latter is to turn these on specific authors

PRINCIPLE 5

If one of the specific subjects is a preliminary auxiliary or a work of reference relating to the other it should have priority

Ex. A bibliography or concordance or biography of an author should have priority over his works

PRINCIPLE 6

Specific subjects to which special principles like the preceding ones are not applicable, may be arranged in traditional order if one such can be found, or otherwise, in any arbitrary order

Ex, It is usual to arrange the forms of literature in the canonical order : Poetry, Drama, Fiction and Prose

THIRD PROPOSITION

" To peruse the book and determine its specific subject *ab initio* on each occasion when it has to be replaced after removal by readers and to determine its correct filiatory place among the other specific subjects would require a very learned man Even for him, the task will be arduous and will require much time Nor is he likely to be consistent with himself or with others in his judgment Further in a library of some size the task of replacing would require the services of many men This would be criminally uneconomical. Surely it must be possible to leave the arrangement and replacement of books in the hands of juniors and even sub-normal men Even in a large library, one such junior must be able to maintain arrangement by working at it only for an hour or two each day This would be possible only if there be no need to read the books to determine their filiatory place but use some mechanical device This gives us the third proposition of the science of library classification :

Arrangement of specific subjects and books in a filiatory order should be mechanised

FOURTH PROPOSITION

The fourth proposition of the science of library classification is a negative one

It asserts that alphabetisation by the names of specific subjects cannot serve as a means of mechanising their filiatory arrangement

Let us take a few specific subjects of the Main Class Geography and arrange them in an alphabetical order Their order can be shown thus—

Bibliography of geography
Economic geography
Geography
Indian journal of geography (begun in 1926)
International Geographical Conference
(first conference 1850)
Journal of Royal Geographical Society
(begun in 1830)
Political geography
Scottish geographical magazine (begun in 1884).

Surely this is far from being an arrangement according to the degree of mutual relation between the eight specific subjects. If they are arranged among themselves in a filiatory order they would stand thus —

In fact it has been found from experience that the best plan is to conceive of such a consistent system of ordinal numbers as constituting an artificial symbolic language It is called Classificatory Language and the ordinal numbers are called Class Numbers '; This experience has led to the sixth proposition of the science of library classification which reads thus–

To mechanise the filiatory arrangement of all specific subjects–past, present and future and known as well as yet-to-be known–an artificial symbolic language made of ordinal numbers and called classificatory language is needed to represent them

" A classificatory language should have its own grammar, morphology, syntax dictionary and rules of composition. The name of each specific subject should be translated into that language The process of such a translation is Classification and its result is the Class number of the specific subject The dictionary of a classificatory language is called its Schedule or Scheme of Classification '

The efficiency of a scheme of classification is measured by the degree to which it fulfils the purpose of providing a distinct or different class number for each specific subject, however many they may be,

and securing a filiatory order among the specific subjects when arranged by their class numbers According to the Colon Classification the specific subjects of Geography which we have considered just now will get their class numbers thus.—

Ua	Bibliography of geography
Um2.N26	Indian Journal of geography
Um3:M30	Journal of Royal Geographical Society (Begun in 1830)
Um563:M84	Scottish geographical magazine (begun in 1884)
Up1:M50	International Geographical Conference (first conference 1850)
U	Geography
U5	Political geography
U6	Economic geography

In our next discourse we shall consider the General Theory of Classification and the Canons pertaining to the Associated Scheme of Characteristics

REFERENCES

1 Ranganathan (S. R.). SUGGESTIONS FOR THE ORGANIZATION OF LIBRARIES IN INDIA (P. C)



LECTURE 4

GENERAL THEORY OF CLASSIFICATION

I

ASSOCIATED SCHEME OF CHARACTERISTICS

1 Canons : A Set of Tests. 2. Fundamental concepts and terms. 3. The Term Entity 4 The Term Attribute 5. Like and Unlike. 6. The Term Characteristic 7 Canon of Differentiation. 8. Canon of Concomitance, 9. Canon of Relevance. 10. Canon of Ascertainability 11 Canon of Permanence. 12. Canon of Relevant sequence. 13. Canon of Consistency

CANONS : A SET OF TESTS

In our last discourse, we considered the special method of subdivision, the special method of constructing class numbers as has been prescribed by the author and the special terminology used by him in the construction and analysis of the class numbers

We shall now take up for our consideration the Canons of Classification as enunciated by Dr Ranganathan

Before enunciating his Canons Dr Ranganathan studied the Principles and Canons laid down and enunciated by W C Berwick Sayers and E.C Richardson

He critically studied the schemes of classification of his predecessors and then in 1937 he prepared his *Prolegomena*. The total number of Canons is 28

These Canons are a set of Tests which help us to appreciate the strength and weakness of a scheme of classification to compare the relative merits of two or more schemes and to do the day to-day work of classification in a library consistently and in conformity with the chosen scheme.

FUNDAMENTAL CONCEPTS AND TERMS

The fundamental concepts and terms associated with schemes of classification are first examined and defined by the author as a preliminary measure so as to enable him to arrive at the Tests, to enunciate them in exact language to lay down a system of procedure and to study schemes of classification in precise and concise terms

This question of examining fundamental concepts and, terms or the technical terminology as it is sometimes called associated with schemes of classification necessarily requires to be considered first Because it is quite essential to learn the special terminology pertaining to any technical subject for its proper understanding as a preliminary step This

helps us much to gain clarity and economy of thought at all later stages

The fundamental concepts and terms as introduced and described by the author are:—

(1) Universe (2) Original Universe (3) Entity, (4) Attribute, (5) Characteristic, (6) Unitary Group, (7) Multiple Group, (8) Assortment, (9) A Class (10) An Array (11) A Chain (12) Filiatory Arrangement, *etc.*

The general canons of classification are developed in five groups in relation to the five concepts or fundamental categories involved in a scheme of classification *viz*:—

(1) Associated Scheme of Characteristics
(2) Any Array of Classes
(3) Any Chain of Classes
(4) Terminology and
(5) Notation

Let us now consider the fundamental terms used by the author

THE TERM ENTITY

We shall begin with the term 'Entity An Entity is any existent concrete or conceptual being *i e* a thing or an idea,

For example,

(1) A boy is an Entity
(2) A book is an Entity
(3) A School of philosophy is an Entity
(4) A subject of study is an Entity
(5) Every individual sitting this class is an Entity

THE TERM ATTRIBUTE

Now we pass on to the term 'Attribute.' " An Attribute is any property or quality of an entity

EXAMPLES

In the case of a book, some attributes may be indicated thus–

(1) Subject-matter
(2) Form in which the subject-matter is expounded say as a catechism or as a dictionary or as a skeleton or as a narrative
(3) Colour of the covering material
(4) Quality of the paper
(5) Author
(6) Language
(7) Year of publication
(8) Printer and so on

LIKE AND UNLIKE

" Two entities are *Like* with reference to a given attribute when they share it equally in measure, intensity extent or in any other way "

' Two entities are *Unlike* with reference to a given attribute if they do not share it equally in measure, intensity ,extent or in any other way "

EXAMPLES

Ranganathan s *Prolegomena to Library Classification* and Sayers' *Manual of classification* are *like* with reference to their *subject-matter* but *unlike* with reference to their *author*

" It must be noted that the terms *like* and *unlike* have no significance

(1) except with reference to an attribute

and

(2) unless there are two or more entities with that attribute *i, e* possessing that attribute or having that attribute '

Ranganathan's *Prolegomena* is like Sayers *Manual* with reference to the attribute *subject-matter* because they are two entities possessing that attribute to the same extent

Similarly these two books are unlike with reference to the attribute *author* and because these books form

two entities possessing that attribute but in different ways

THE TERM CHARACTERISTIC

Now we pass on to the term 'characteristic'

A 'characteristic' is any attribute or any complex of attributes with reference to which the likeness or unlikeness of entities can be determined and as a result of the application of which it is expected that at least two of them are found to be unlike

EXAMPLES

In the classification of the two books on classification, we have just referred to Author is a Characteristic' but their subject is not although both of them are attributes

Possession of the subject *viz* 'classification is shared exactly similarly by these two books and hence with reference to it these two books are like Thus it is not a characteristic' of these two books for the purpose of classifying them considered as entities

If we take several books of the same author as entities *author* will not be a characteristic

The main difference between an attribute and a characteristic is that an attribute when applied to

entities may show all like entities or some of them like and the remaining unlike. When an attribute shows unlike entities then it is designated as a characteristic.)

UNIVERSE

" A universe is any aggregate of entities under consideration

This class room can be called a universe having an aggregate of entities forming the persons sitting here

The term ' characteristic is a basic term and denotes a fundamental conception in classification It is used to express the principles by which a group is divided (as genus into species) In popular words, it is described as the *differentiating quality* or attribute by means of which we recognise the division of a class, e g. the characteristic that divides the animal kingdom into two parts may be the absence or presence of a backbone and with reference to this characteristic we can distinguish them as *vertebrates* (i e animals possessing a backbone) and invertebrates (i e animals having no backbone).

CANON OF DIFFERENTIATION

The first Canon pertaining to characteristics is the Canon of Differentiation It stipulates that " each characteristic used should be an attribute that

differentiates i. e. one which gives rise at least to two classes "

This may be referred to as the Canon of Differentiation.

This canon is enunciated by Sayers thus—

A classification proceeds by the assembly of the groups of sciences or of the pricipal fields of knowledge into main classes (or divisions) which are co-ordinate with the theory of knowledge adopted Such classes have great extension and small intension The process is continued by the addition of *differentiating qualities* in each main class and thus subclasses or divisions are made, the differentiating qualities being the likeness which groups the things in each division Each division in turn is divided by further differentiating qualities to produce the subdivision and by others successively to make the sections and subsections, until further subdivision is impossible "

This process of dividing a class by differentiating qualities is systematically followed in the Colon Classification In fact every schedule of the main classes of the scheme begins with the statement of the successive Trains of Characteristics used for the subdivision of the class. The rules in the first part give further instruction regarding the order and use of the characteristics e g

Three Trains of Characteristics are to be used for the subdivision of History viz Geographical Division or 'G Problem Division or 'P and Chronological Division or 'C'

The three Trains of Characteristics, forming the basis of classification of History are to be taken in the order 'G 'P 'C'

The formula regarding the order of the characteristics is written thus:-

$$[G] : [P] : [C]$$

Out of the characteristics shown in the formula, we have seen the table of geographical divisions and that of chronological divisions

The main divisions based on the train of problem characteristic as given under the formula for the classification of History, read thus:—

1 Political and general
2 Constitutional
3 Economic
4 Military, naval and aerial
5 Cultural
6 Tradition language and literature as sources
7 Archaeology, epigraphy etc
8 Archives

With the help of the divisions of the three characteristics in the formula we can construct class numbers for any specific subject pertaining to the main class History Now let us take an example.

Dodwell (H H) Ed Indian Empire, 1858–1918 The specific subject of this book is ' Political History of India covering the period, 1858–1918 As this specific subject belongs to the Main Class ' History ' we first write the Main Class Number, thus:—

V

Now from the table of Geographical Divisions, we have to pick out the appropriate digit for India. The digit 2 is assigned to Mother Country and as India is our Mother Country, we put the digit 2 after V, thus:—

V2 which means History of India

The second characteristic is the characteristic of Problem Divisions The Problem Division appropriate to the specific subject of the book is ' 1 Political and General The digit 1 is written after a colon thus—

V2:1

The class number now simply means ' Political History of India ,The period of the political History

of India covered by the book is 1858 to 1918 The last decade of the period covered by the book is the second decade of the 20th century, which is represented by the digits N 1 according to the table of the chronological divisions These digits are to be written in the class number, thus –

V2:1:N

This class number means ' Political History of India brought upto the second decade of the 20th century and thus it is coextensive with the subject of the book

Books of history deal with different periods— they have got different earlier time or period end-points and later period end-points In such cases the author has recently introduced a device of writing first the symbols indicating the later time end-point then a backward arrow (←) and lastly the symbols indicating the earlier time end-point In the present instance the period of the book is 1858–1918 and it can be shown thus —

V2 1:N18←M58

which means History of India ' covering the period 1858 to 1918 This method helps us to arrange books having the same later time end-points but

different earlier time end-points according to their increasing periodicity

" Books like those of the ' Tod y and tomorrow series ' which take a peep into the future have their time-focus in the future The time facet of their class numbers also should have a corresponding focus in their Time-Facet. This focus is got by writing down the numbers for the present point of time and adding " → " (forward arrow) after '

For example

A N→ Russell (B) *Icarus or the future of science*

In this example

A is Science general,

is a connecting symbol recently proposed for use for the time facet in a class number by the author in his recent article on Optional Facets in Library Classification (1), appeared in ABGILA V I, No 2, June 1949

→ The forward arrow indicates that the book treats of the future development of science

In the article just referred to Dr Ranganathan has proposed for use different connecting symbols for different facets in a class number which are manifestations of the five fundamentals, *viz.*–Time, Space Energy, Matter and Personality For the facets of Time and Space the connecting symbol proposed is full-stop ( ). In that article, Colon (:) is proposed to be used for the manifestation of Energy facet. For example

Radhakrishnan's *Kalki or the future of civilization* gets a class number thus:—

Y1:1.N→

in which

Y1 is the Main Class Sociology

: is a connecting symbol indicating that the digit that follows it, is a division or focus of the Energy facet

1 is the manifestation or focus of the problem civilization in the Problem or Energy Facet of the formula of characteristics fixed for the classification of the Main Class Sociology

is a connecting symbol manifesting the Time Facet that follows it

N is the Chronological division number meaning 1900 s

→ is a connecting symbol indicating that the book deals with the future development of the subject Civilization

Thus the whole class number virtually means 'the future of civilization',which is the subject of the book

Similarly when the Fundamental Element 'Matter manifests itself in the Fecet of a class number the digit used as the connecting symbol is a semi-colon ( ) and when the Fundamental Element Personality manifests itself in the Facet of a class number the digit used as the connecting symbol is a comma (,) The Colon Classification uses two other connecting symbols, viz. (1) a Zero (0) to connect a Bias Phase and a Dash (–) to connect a Focus in a Facet with another Focus in the same Facet to form a sharper focus by the Auto-Bias Device We shall consider these Devices during one of our discourses later on (If arranged in the ascending order of their ordinal values these connecting symbols will stand thus —

0 : , –

Zero, Full-stop, Colon, Semi-colon, Comma, Dash

In his second article on Optional Facets appeared in ABGILA \ 1 No 3, Sept 1949, Dr Ranganathan has shown two types of calendars featuring in different specific sbujects viz. (1) a Public calendar and (2) a

Private calendar The Chronological Divisions that are required to be used in the case of certain specific subjects are the divisions of the public calendar " But there will be specific subjects where time measures by public calendar will not be relevant. The only relevant measure of time will be the one measured from an origin determined by the specific subject itself—according to its private calendar so to speak Focus determined on the basis of a public calendar may be called Public Time Focus and the one determined on the basis of the private calendar of a specific subject may be called Private Time Focus

To distinguish a time-facet with private foci from the one with public foci, it is proposed to use the slant stroke "/" as the connecting symbol for the former Its ordinal value is defined so as to make it lie between '0' and ' Instead of going into further details we shall give an example in which this symbol is required to be used

Let us take "My Indian Years, 1910 – 1916 ' by Lord Hardinge. The class number for this specific subject is written thus:—

V2:21wM58/58←52

In this class number,

V is History

2 is a Geographical Division number meaning India

: Indicates change of Facet

21 is a Problem Facet Number meaning 'Crown President' and analogically it represents the Viceroy of India

w is a common subdivision number meaning biography

M58 is a Chronological Division Number meaning 1858 which was the birth date of Lord Hardinge

/ is a special connecting symbol showing the period of the private calendar featuring in book *viz* the years 1910 1916. In 1910 Lord Hardinge was 52 years old and in 1916 he was 58 years old These years are said to be the time measures of a private calendar and they are to be shown after a slant stroke as written in the class unmber the latter age point to be written immediately after the slant stoke then a backward arrow and afterwards the earlier age-point Such a minute classification is required in documentation work The number occuring before the slant stroke will ordinarily be sufficient in *non-documentation or book-classification*

This information regarding the new connecting symbols recently introduced by the author is given with a view to show the latest progress of the scheme But in our discourses we shall use only three connecting symbols, *viz* a zero (0), a Colon (:) and a Dash ( ) which are at present used by the scheme

CANON OF CONCOMITANCE

Now we shall pass on to the Canon of Concomitance It reads thus—

'No two characteristics should be concomitant i e should divide a subject into the same sub-aggregates or the same sub-divisions "

This may be referred to as the Canon of Concomitance

Age and year of birth are concomitant characteristics as they divide persons into the same set of sub-aggregates But height and age, since they are independent characteristics, will in general divide persons into two different sets of sub aggregates

The date of first publication and the date of first edition connot be considered as two different characteristics for classifying books

CANON OF RELEVANCE

The third Canon pertaining to Characteristics is the Canon of Relevance

It stipulates that each characteristic should be relevant to the purpose of classification

This may be referred to as the Canon of Relevance

Taking the universe of books, if the purpose of classification is to suit the needs of the readers in a library, subject-matter language, date of publication and author may be relevant characteristics

But the cover of books the paper used for the books, the type used for printing are not relevant characteristics for the purpose if the classification is to suit the needs of the readers

CANON OF ASCERTAINABILITY

The fourth canon is the canon of ascertainability it reads thus:—

Each characteristic should be definitely ascertainable."

This may be referred to as the Canon of Ascertainability

Unless this test is satisfied it will be difficult to use the characteristic. To give a ridiculous example, the date of death is a characteristic of the persons in a group as there is next to no probability for all the

persons to die on the same date But it is not definitely ascertainable

In the Literature Class the Decimal Classification uses a characteristic which would divide writers as 'Major writers and 'Minor writers' But this characteristic is not definitely ascertainable It has been found that certain writers that were considered as minor writers at one period were included among 'Major writers in course of time.

The characteristic used for classifying literary writers in the Colon Classification is the year of birth of the author This characteristic is definitely ascertainable and hence it completely satisfies the Canon of Ascertainability

In the Decimal Classification John Donne an English poet born in 1573 will get 821.39 as his class number along with other poets considered as 'minor poets of the Elizabethan Period This class number simply means "Minor writers during the Elizabethan Period" and does not indicate John Donne definitely and hence the characteristic used for the classification of this writer as a "Minor Writer" is not definitely ascertainable

But in the Colon Classification the characteristic used for the classification of literary writers is the

year of birth which is definitely ascertainable

According to the Colon Classification, John Donne will get O 1J73 as his class number

The formula for the classification of Literature reads thus:—

Four trains of characteristics are to be used for the subdivision of Literature *viz.* Language or L Form or 'F' Author or A and work or W"

The four trains of characteristics, forming the basis of classification of "Literature" are to be taken in the order L', 'F' A', W'

This formula is written thus—

O [L] : [F] : [A] : [W]

The Language Number is to be taken from the Language classes given in the Schedule No 4 of Part II In the case of the literature in the Favoured Language, the Language Number may be taken as understood and need not be actually written

In the class number taken as an illustration the language number is taken as understood as the English Language is considered as the Favoured Language

So the language number having been omitted the digit,

O means English Literature

: indicates change of characteristic

1 is the Form Number meaning Poetry

J73 is the Author Number [This number is constructed by the Chronological Device according to the schedule of Chronological Divisions It means 1573 which is the year of birth of John Donne]

Thus the whole class number means an English poet born in 1573 and John Donne having been born in 1573 it naturally means John Donne and no other poet Thus the characteristic used for the classification of literary authors i e the year of birth, being definitely ascertainable fully satisfies the Canon of Ascertainability

There are prescriptions to distinguish between two or more English poets born in the same year

Two or more literary authors born in the same year are distinguished by amplifying the digits representing the year of birth of each of them by the particular number of the month in the year in which the particular author was born

Let us suppose that an English poet was born in the year 1809 Then the class number for this poet

would be written thus:-

O:1M09

If there are other English poets born in the same year then we shall have to find out the months in which these poets were born Supposing that one of them was born in the month of June and the other in the month of September and the third in the month of November the class numbers for these poets can be written thus –

O 1M096 An English poet born in the month of June of the year 1809 (the last digit in the class number indicates the number of the month in the year)

Similarly the second poet will get

O 1M099

as his class number and the third poet will get

O:1M0911

a his class number

The digits of the months in these numbers are to be read as integers

The rule in this connection reads thus :— In the case of the divisions E onward , where each letter stands for a century the decade is to be indicated if necessary by adding the digit of the decade – 0 1 ,9

as the case may be – after the century digit The year is to be indicated if necessary by adding the digit of the year –0 , 1, .9 as the case may be – after the decade digit. The month is to be indicated if necessary by adding the number of the month as 1, 2, 3, etc. as the case may be after the year digit The number representing the month is to be read as an integer and not as a decimal, if it consists of more than one digit Thus in the number M096,

M	denotes the 19th century
M0	denotes the 1st decade of the 19th century
M09	denotes the year i e. 1809 in the 1st decade of the 19th century
M096	denotes the month i e 6th month, meaning June in the year 1809

And thus the class number

O:1M096

means an English poet born in the month of June of the year 1809 and no other poet

CANON OF PERMANENCE

The fifth Canon is the Canon of Permanence It stipulates that each characteristic should be definable

and endure unchanged, as long as there is no change in the purpose of the classification

This may be referred to as the Canon of Permanence

Let us take an example from the universe of books It has been the tradition to divide periodicals into two classes—those that are published by Learned Societies being put in one class and those that are not so published into another This has led to not a little difficulty in libraries, because periodicals undergo frequent changes in the authority of agency publishing them

For instance

The *Journal of Indian Botany* was launched as a private concern in Sept 1919 It was the property of a private individual In 1921, the Botanical Society came into existence At a meeting held on Feb 3rd 1921 it was decided that the *Journal* should be taken as the property and official organ of the Society In fact with the second issue of v 3 it became the official organ of that Learned Body

In a library where a large number of periodicals are received, the difficulty caused by such cases of changes of characteristics will be so pronounced that

the library will have to decide to give up this characteristic of classification and to put both kinds of periodicals in one and the same class And this practice, has actually been followed in the Colon Classification The rule regarding the definition of Learned Societies and the classification of their publications in the scheme reads ,thus: –

' The term *society* is used to denote a Learned Society founded and maintained for the pursuit of one or more branches of knowledge The digit *I* is to be used in the case of a book which gives an account of the Society But in the case of occasional or periodical publications issued by the Society the digit *I* is not to be used Such publications are to be treated as ordinary books or as periodical publications as the case may be '

For example, the *Journal of Indian botany* will get as its class number Im2:N19 and the report of the Indian Botanical Society will get as its class number I]2:N21r and its history I]2 N21pN4 while according to the Decimal Classification all these publications will be classed under one and the same number 580 6254 and thus it will not be possible for us to distinguish them The first two volumes and the first issue of the 3rd volume of the journal will have to be given the class number 580.5 and not 580 6254 as these volumes

were published as the property of a private individual and not of a society and thus the Canon of Permanence is violated by the Decimal classification in the case of this journal This is very vexing for those libraries that are classifying their resources according to the Decimal classification

"Form" is not used as a characteristic to divide or classify the universe of poems as opinion changes frequently regarding the forms of poetry such as lyric, narrative ode, elegy sonnet epic, and so no

CANON OF RELEVANT SEQUENCE

Now let us pass on to the Canon of Relevant Sequence It reads thus:—

"The sequence in which the characteristics of the scheme are to be used should be *relevant* to the purpose of classification "

This may be referred to as the Canon of Relevant Sequence

Let us take an example from the universe of books

According to the Colon Classification, 'Organ as well as Problem are used as characteristics both in Medicine and in Zoology But in Medicine, Organ occurs before Problem whereas in Zoology Problem

occurs before Organ This variation in the sequence of the two characteristics is made in the light of the primary lines of specialisation which obtain in the two subjects and of what is felt to be a comfortable order by the readers of the books in these two subjects

Let us illustrate this by means of examples Let us first take an example from the main class Medicine

The formula for Medicine reads thus —

L [O]:[P] [H]

in which

L	is Medicine
O	indicates Organ characteristic
:	indicates change of ,,
P	is Problem characteristic
:	indicates change of ,,
H	is Handling characteristic

According to this formula a book with the title "Treatment of diseases of the respiratory system" will get L4 4:6 as its class number which can be interpreted thus —

L	is Medicine
4	Organ number meaning Respiratory system

:	indicates change of characteristic
4	is Problem Number meaning Diseases,
:	indicates change of characteristic
6	is Handling Number meaning Therapeutics

Now let us take an example from the main class Zoology

In the case of the Ecology of animals, the formula of characteristics as prescribed in the Colon scheme is written thus:—

K [N]:5:[G]:[O]

In this formula,

K	means Zoology
N	represents Natural group characteristic,
:	indicates change of characteristic
5	is Problem Number meaning Ecology
:	indicates change of characteristic,
G	represents Geographical Division characteristic,
:	indicates change of characteristic
O	represents Organ characteristic.

From this formula, let us construct class number or the subject, viz "Mammalian ecology with special ttention to the Colours of desert mammals "

The relevant digits representing the sections in the formula pertaining to the specific subject in hand can be written thus:—

K97:5:1911:875

We can interprete the class number thus —

K	is the Main Class Zoology
97	is the Natural group division, *viz* Mammalia
	indicates change of characteristic
5	is the Problem Division Number for Ecology which means animals in their natural surroundings.
	indicates change of characteristic
1911	is Geographical Division Number meaning Deserts In this number the digit 1 means World, 19 means ' Physiographic divisions', 191 means ' Land regions , and 1911 means Deserts
875	is Organ Division Number in which 8 represents Other organ systems 87 represents Skin and 875 represents Pigment which means Colouring matter in the tissues of animals and plants

Thus virtually the class number K97 5 1911 875 is equivalent to the specific subject of the book, *viz*

Mammalian ecology with special attention to the colours of desert mammals,

The Decimal Classificatoin Number for this subject will be either 591.15 Ecology or 599 Mammalia and hence none of them is co-extensive to the specific subject

CANON OF CONSISTENCY

The seventh Canon pertaining to the characteristics is the Canon of Consistency

It stipulates that the characteristics of the scheme and the sequence in which they are to be used should be fixed and consistently adhered to

This may be referred to as the Canon of Consistency

This Canon requires consistency not only in the characteristics used but also in the sequence in which they are used It is obvious that lack of consistency will lead to chaos and defeat the purpose of classification.

Once the choice and the decision are made, we should not deviate from them

Let us take a few examples—

, For the universe of books in history the Decimal Classification has chosen the Geographical

and Period characteristics and has decided their *sequence* as Geographical and Period Those that use the Decimal Classification should not change this decision from time to time They should adhere to the decision *consistently*.

2 For the same universe, the Colon Classification has chosen three characteristics instead of two They are the Geographical the Point of View and the Period characteristics The scheme has also decided this as the most relevant sequence

The rules regarding the choice of these characteristics and their *sequence* read thus – Three Trains of characteristics are to be used for the subdivision of History *viz* Geographical Division or G ' Problem Division or ' P ' and Chronological Division or C

Apart from the *Penultimate Octave Divisions* and the *Common Subdivisions* and the *Bias Number Divisions* that may be applied to any subclass of History, the natural special subdivisions of history will have to be based on the three characteristics mentioned in this rule The three trains of characteristics, forming the basis of classification of History, are to be taken in the order G ', ' P , ' C

A simple calculation will show that there are six ways of taking the three characteristics in order The

problem is to decide which of these six possible orders will be most convenient for those who use the books It is only the experience of libraries that can give the necessary information about it

The order suggested by the rule has been found to be quite convenient The result of the order may be put thus –

' We shall imagine all the history books divided according to the country of which they treat and we shall imagine a separate building for the history of each country A reader interested say in Indian History, will have to go to the Indian History Building, so to speak On entering the building he will find that all the books on the political history of India are put in one room, all the books on the constitutional history of India are put in another room all the books on the economic history of India are put in another *room* and *so on Let us* *assume* that the reader is interested in the constitutional history of India and that he enters the constitution room There he will find several cupboards, each devoted to a particular epoch Roughly speaking this is the result of taking the characteristics in the order given by the rule "

In the room assigned to the Constitutional I of India we shall find books treating of the co

1 is World
2 is Mother Country
3 is Favoured Country
and so on

These individual divisions are the Foci of the Facet of the Geographical Divisions When any one of these divisions features in a class number, it is called the focus of the facet of Geographical Divisions and hence in the present class number the Geographical division 2 i e. India is the Focus of the Facet of Geographical Divisions

We shall consider Arrays of Classes in our next discourse

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LECTURE 5

GENERAL THEORY OF CLASSIFICATION

II

ARRAYS OF CLASSES

1 Brief Resume. 2. An Array 3. Canon of Exhaustiveness. 4 Canon of Exclusiveness. 5 Canon of Helpful Order 6. Canon of Consistent Order 7 Common Subdivisions. 8. Geographical Device. 9. Chronological Device. 10. Colon Device 11 Subject Device 12. Bias Number Device.

A BRIEF RESUME

In our last discourse we saw how characteristics play a prominent part in classification We then considered seven canons pertaining to characteristics

The Canon of Differentiation indicates how sub-classes and divisions are made from the Main clases by the application of relevant differential qualities and how these qualities help us to form groups of like things in each division, sub-division section and sub-section until further subdivision is impossible

The Canon of Concomitance stipulates that no two characteristics should divide a subject into the same sub-divisions

The Canon of Relevance wants each characteristic used to be relevant to the purpose of classification

Then Canon of Ascertainability requires each characteristic used to be definitely ascertainable,

The Canon of permanence puts a condition that each characteristic should be definable and endure unchanged as long as there is no change in the purpose of classification

The sixth Canon *viz* the Canon of Relevant sequence wants the sequence in which the characteristics of the scheme are to be used to be *relevant* to the purpose of classification

The last Canon pertaining to the characteristics is the Canon of Consistency It stipulates that the characteristics of the scheme and the sequence in which they are to be used should be fixed and consistently adhered to We shall now take up for our today's discourse Arrays of classes

AN ARRAY

An Array is the sequence or succession of the classes of a universe arranged among themselves according to their ranks

To illustrate this we shall take the Main Classes, Divisions and Sections of the Decimal Classification

Its Main Classes represent an Array of the First Order *viz*:—

1 Philosophy
2 Religion
3 Sociology
4 Philology and so on

The divisions of these classes represent Arrays of the Second Order

Thus under Philosophy

11 Metaphysics
12 Metaphysical Topics
13 Mind and Body
14 Philosophical Systems, and so on as an Array of the Second Order

The Sections of these Divisions represent Arrays of the Third Order

Thus under 11 Metaphysics we have

111 Ontology
112 Methodology
113 Cosmology
114 Space
115 Motion
116 Matter and so on represent an Array of the third order

There are two canons pertaining to the Arrays of Classes Each Array of Classes in a scheme of classification should satisfy these canons

CANON OF EXHAUSTIVENESS

The first Canon is the Canon of Exhaustiveness It reads thus:—

The Classes in any Array of Classes should be totally exhaustive of their common immediate universe

This may be referred to as the Canon of Exhaustiveness.

The Canon means that every entity comprised in the immediate universe should find a place in one of the classes in the Array derived from the immediate universe

The real value of the Canon consists in drawing our attention to the need for examining if the enumeration of classes in the Array has been correctly completed

To take an example, in the Decimal Classification throughout the class Literature a class entitled Minor poets ' or " Minor dramatists " or ' Minor writers ' comes after the enumeration of certain individual authors

Such a provision of residual classes under the caption " other " can also be seen scattered throughout the Decimal Classification

The Decimal and the Colon Classifications *formally* satisfy the Canon of Exhaustiveness with equal efficiency as far as their lay-out of the Main Classes or their First Order Array is concerned, by the provision of classes which appear, from their names or otherwise, to be residual classes *i. e.* classes which are expected to accommodate any new classes not already provided for in the scheme

Examples:—

In the Decimal Classification

0 Generalia,
3 Sociology,
5 Pure Science and
6 Useful Arts

are residual classes

Similarly in the Colon Classification the Main Classes *viz*:-

1–9 Generalia
A Science (General)
G Natural Science (General)

M Useful Arts

Y Social Sciences (General)

are residual classes

These classes are called residual classes due to their miscellaneous nature and having a wider scope of comprehension than the other main classes as is indicated by their very names and therefore we expect that any new branch of human knowledge that may crop up in future may be conveniently accommodated in any one of these classes on the basis of the Canon of Context which we shall consider later

The Canon of Exhaustiveness is not *actually* satisfied in arrays of higher order by the Decimal Classification. This is due to the fact that its notation limits the number of classes in any Array to 10 The Second Order Array of all its residual classes have exhausted all the ten classes Hence any new subject that crops up can not be accommodated in the class in a natural way It has to be squeezed in somewhere like an unwanted stranger

Let us illustrate this by means of examples

1) The term ' *Sociology* is used in the Decimal scheme in the sense of Social Sciences and hence there is no place for the new subject ' Sociology

(proper) that has taken shape in recent years The vague subclass 360 Associations which includes Insurance 368 and the subclass 390 Customs may accommodate part of 'Sociology but even these classes are not placed adjacent to each other Other branches of 'Sociology' like Social Pathology are not provided for anywhere in the schedule

The Colon Classification has included 'Social Pathology' as division 4 under the Problem Characteristic in Y1 Sociology Its subdivisions and the corresponding divisions under the Decimal scheme, read thus:—

C C No		D C No
Y1 : 4	Social Pathology	?
Y1 : 41	Intemperance	178
Y1 : 42	Degeneration	364.2
Y1 : 43	Destitution	339 1
Y1 : 44	Social evil	176 5
Y1 : 45	Crime	364 2
Y1 : 46	Short life	?
Y1 : 48	Disunion	?
Y1 : 484	Espionage	172 4

From this table we see that the class numbers corresponding to these divisions are spread over under (1) Ethics, (2) Economics and (3) Reformatory organisations in the Decimal Scheme

Again, topics dealing with man in society like Prehistoric Archaeology, Ethnology and Anthropology have to find shelter under 570 Biology which is strictly the pure science of living organisms, their ontogeny and philogeny and has nothing to do with social life of humans in groups.

2) The situation is even worse and almost borders on the ridiculous in the case of the ancient subject of ' Forestry ' which is given the ninth place under the class 634 Fruits and is closely followed by the class 635 Kitchen garden in 630 Agriculture

3) Biochemistry which requires a place in 540 Chemistry is put under Biology (574 19)

4) All the available places have already been used up in 3 Sociology 5 Pure Science and 6 Useful Arts, It is a problem how any new Science with an individuality of its own and co-ordinate with but not sub-ordinate to existing classes, is going to be accommodated

We have seen that in the Colon Classification the classes

1-9 Generalia
A Science (General)
G Natural Science (General)
M Useful Arts

Y Social Sciences (General)
are residual classes

The scheme emyloys the concept of ' open arrays' and octave notation to meet this Canon

CLOSED ARRAYS AND OPEN ARRAYS

An array of class numbers which does not admit of extrapolation (i e extention by adding new divisions) at the right end is called a Closed Array

An array of class numbers which admits of extrapolation at the right end is called an open Array

1) In the Decimal Classification 3 arrays of the First Order 18 arrays of the Second Order and just a few arrays of the Higher Orders are kept as open arrays by the ' other ' Principle. They are,

ARRAYS OF THE FIRST ORDER

290	Non-christian religions
490	Other languages
890	Literature in other languages

ARRAYS OF THE SECOND ORDER

149	Other philosophical systems
179	Other ethical topics
199	Other modern philosophers
259	Other ministrations
289	Other christian sects

299	Other non-christian religions
369	Other associations
439	Other Teutonic languages
499	Malay-Polynesian and other languages
629	Other branches of engineering
668	Other organic chemical industries
689	Other trades
719	Other topics in landscape gardening
879	Other Italic literatures
889	Other Hellenic literatures
899	Malay-Polynesian and other literatures
939	Ancient history of other countries
949	Other countries of Europe

The remaining arrays of the First Order, 63 Arrays of the Second Order and most of the arrays of the Higher Order are closed arrays. They are:—

ARRAY OF THE FIRST ORDER

090	Book rarities
190	Modern Philosophers
390	Customs Costumes Folklore
590	Zoology
690	Building
790	Amusements
990	Oceania and polar regions

ARRAYS OF THE SECOND ORDER

119 Quantity, Number

129 Origin and destiny of individual soul and so on

f1) In the Colon Classification practically all the arrays are kept as open arrays by the Octave Principle, the Subject Device, the Chornological Device, the Geographical Device and the Alphabetical Device

CANON OF EXCLUSIVENESS

The second canon pertaining to the Arrays of Classes is the Canon of Exclusiveness

It stipulates that the classes in an Array of Classes should be mutually exclusive

This may be referred to as the Canon of Exclusiveness

This means that no entity comprised in the immediate universe can belong to more than one class of the array In other words, no two classes of the array can overlap or have an entity in common,

This condition will be automatically satisfied if we follow the principle that the clases of an array are to be derived from its immediate universe on the basis of a single characteristic

To show that it is possible to construct an Array without adhering to a single characteristic, an example may be given

The divisions under 330 Economics of the Decimal Classification are not drawn from the same characteristic

The divisions,

334	Co-operation	XM25
335	Socialism and Communism	XN17

are based on the Special Types of Economic Organisations in the Colon classification and are given co-ordinate placings with the Main Class X Economics as they get subdivided on the basis of all the four Trains of Characteristics *viz.* (1) the Business characteristic, (2) the Economic characteristic, (3) the Geographical characteristic and (4) the Chronological characteristic, on the basis of which the Main Class Economics itself is subdivided These special types get individualised by the Chronological Device The year in which they were invented is used for the amplification of the Main Class Number X and the digits representing the years as derived from the table of chronological divisions are written after the digit X thus —

XM25	Is Co operative Organisations
XN17	Is Socialistic and Communistic Organisations

In these numbers M25 indicates the year 1825 when the Co-operative Organisation as a special type of Economic Organisation was recognised Similarly N17 indicates the year 1917 when the Socialistic and Communistic Organisation was recognised.

The divisions

332	Banking *etc.*
336	Public Finance

are based on the Business Characteristic These divisions are shown as the divisions of the Business Characteristic in the Colon Classification, thus:—

X6	Banking *etc.*
X7	Public Finance

Again the divisions —

331	Labour
333	Land Ownership, *etc.*
337	Protection and Free Trade
338	Production
339	Distribution

belong to the Economic Characteristic. They are given appropriate placings by the Colon Classification under the divisions of Economic Characteristic, thus –

X 2	Production
X : 3	Distribution
X : 332	Land Ownership *etc*
X : 53	Protection and Free Trade
X : 9	Labour

If we have a book on 'Co-operative Banking', we find that it is put under 332. 3 as well as under 334.2 in the Decimal Classification while we see in the Colon Classification that this subject is consistently put under XM25 Co-operation, having been numbered as XM2562 with the mnemonic number 62 for Banking. The number can be interpreted thus —

XM25	Co-operation
62	Banking
XM2562	Co-operative Banking

The divisions under 330 of the D C as we have seen just now, can be quoted as an instance of cross classification which means the action of division by more than one characteristic in a single process of division, leading to confusion of ideas and terms and resulting in the parts having no real relationship to one another and in placing related subjects in different divisions, i e violating the Canon of Exclusiveness

The co-ordinate placings given to Co-operation and Banking, which are the divisions on the basis of two different characteristics, is the result of division by more than one characteristic in a single process of division thus resulting in a cross classification and leading to confusion Co-operative Banking if classed under Banking would mean separating it from its immediate universe which is Co-operation and thus it would ultimately mean violating the Canon of Exclusiveness

DISSECTION

The process of deriving classes of the first array from its immediate universe on the basis of a single characteristic is termed as the process of *dissection* by Dr Ranganathan In this connection he observes that—

" The simplest method by which a new specific subject is formed is by dissection of a specific subject that is dissected the Immediate Universe and the new specific subjects formed, its Classes of the First Order The dissection is taken to be such that the Classes are Mutually Exclusive The Mutually Exclusive Classes having a common immediate universe are said to form an Array of the First Order with respect to the Immediate universe"[1]

In dissection the boundary lines of the classes formed are exclusive of one another This can be shown thus—

INORGANIC SUBSTANCES

Elements
Hydroxyls
Acids
Salts

These classes are derived on the basis of a single train of characteristic *viz* the Substance or S characteristic

CANON OF HELPFUL ORDER

The third canon is the Canon of Helpful Order It *is* considered as the basic and most important canon of classification

It is enunciated thus —

The order of the classes in any array should be according to some convenient principle and not arbitrary wherever insistence on one principle does not violate other more important requirements "

This may be referred to as the canon of Helpful Order

Dr Ranganathan has shown different types of

principles in his *Prolegomena* (Pp 42-44) and also in his *Elements of Library Classification* (Pp 27-33) that may be available for fixing the order of classes

These principles are.—

(1) Quantitative Order
(2) Developmental Order or Evolutional Order
(3) Spatial Order or Geographical Order
(4) Time Order or Temporal Order or Chronological Order
(5) Increasing Concreteness
(6) Increasing Complexity
and (7) Canonical Order

QUANTITATIVE ORDER

In classifying the universe Geometry' on the basis of the dimension of the space under consideration the Colon Classification arranges the classes in the order Plane, Three dimensions, Four dimensions, Five dimensions and n dimensions i e in ascending order of the dimensions of the space,

Thus:—

Divisions based on the train of Space Characteristic are.—

C C Nos	D C Nos,
B6 Geometry	513

B62	Plane (two dimensions)	513 1
B63	Three dimensions	513 3
B64	Four ,,	513 82
B65	Five ,,	
B67	n ,,	

EVOLUTIONAL OR DEVELOPMENTAL ORDER

EVOLUTIONAL ORDER

If two classes belong to different stages in the same line of evolution, the one at the earlier stage must have precedence over the other

Thus under the class Education, Elementary Education naturally gets precedence over secondary Education on the ground that it belongs to an earlier stage of evolution

If we illustrate this in the form of circles the circle belonging to Elementary Education will be a bigger one and that belonging to Secondary Education will be a smaller one and the circle pertaining to Elementary Education will get precedence over that of Elementary Education on the ground that it belongs to an earlier stage of evolution

DEVELOPMENTAL ORDER

If the characteristic is of a d velopmental nature the order of the classes may be parallel to the course of development

For example,

In classifying the universe ' Zoology ' on the basis of the Natural Group as characteristic, the Congress the Decimal as well as the Colon Classifications arrange the resulting classes in the developmental order beginning with Protozoa (*i.e.* unicellular animals) and ending with Mammalia (*i e* the highest class of back-boned animals) Thus —

C C Nos		D C Nos
K1	Invertebrata	592
K2	Protozoa	593
K3	Porifera	593 4
K4	Coelenterata	593.3
K5	Echino-dermata	593 9
K6	Vermes	595 1
K7	Molusca	594
K8	Arthropoda	595.2
K9	Prochordata and Vertebrata	296, 597, 598
K97	Mammalia	599

The terms ' evolutional ' and developmental ' are synonymous and carry the same meaning. The meaning of these terms as given by O E. D is given below

(1) Evolutional = of or pertaining to evolution; due to or produced by evolution;

(2) Developmental = of, pertaining or incidental to development evolutionary

Chembers's *Technical Dictionary* defines these terms thus:—

(1) Evolution = the gradual development of more complex organisms from simpler forms the development of organs from other organs or from simpler organs of the same type.

(2) Development (*bot*) = The succession of *stages in the life of the plant*, as distinct *from the* simple growth and differentiation by which a mature animal is formed from an ovum or bud

The author *has* used these two terms in the sense of gradual development or growth and hence both these orders may be considered as of the same or similar category

(3) SPATIAL OR TIME ORDER

If the classes correspond to phenomena or relations *in nature or society* which have been long accustomed to look for in a certain spatial (*i e* relating to space), or temporal (*i e* relating to time) or other relational order the classes may be arranged in the same familiar order

In classifying the universe of the processes

involed in Laundry, the D C arranges the classes in the order, Marking, Washing, Starching, Bluing, Drying and Ironing which is the correct time-order

In classifying 'Syntax in Philology the Colon Classification arranges the classes in the order–Subject Adjuncts to the Subject Predicate and Adjuncts to the Predicate which is the correct spatial order The order can be shown, thus:–

P : 3	Function, syntax
P : 33	Analysis
P : 331	Subject
P : 332	Adjuncts to the Subject
P : 335	Predicate
P : 336	Adjuncts to the Predicate

(f) CHRONOLOGICAL ORDER

If one of two classes belongs to an earlier point of time than the other then that one must have precedence over the other If we take two English drama tists, *viz* Shakespeare and Marston and arrange them Shakespeare, having been born in 1564 will naturally get precedence in the arrangement over Marston who was born in 1575

(g) GEOGRAPHICAL ORDER

when a number of geographical areas, not lying within one another are to be arranged, a helpful order

is got by arranging them in accordance with their contiguity

Consider the three provinces Madras, Bombay and the Punjab It is certainly unhelpful to arrange them in the order, Madras, the Punjab and Bombay as it ignores geographical contiguity Either the order Madras, Bombay and the Punjab, or the reverse of this will be more helpful

(6) INCREASING CONCRETENESS

If two classes are of different degrees of conrete ness the less concrete (i e the more abstract) must have precedence over the other

In the Main Class Botany Plant Anatomy and Flowering Plants are the two classes of different degrees of concreteness Of these, Plant Anatomy (I 2) is less concrete (i e more abstract) than Flowering Plants (I5) and hence it must get precedence over the latter to get helpful order in the arrangement

(7) CANONICAL ORDER

If the classes are being traditionally referred to in a specific order though no underlying principle is discoverable it will be a convenience to conform to this traditional order It may happen that no specific characteristic can be isolated as forming the basis of the derivation of the classes except

that the classes may be simply the classes into which their immediate universe has been traditionally divided In the Colon Classification such classes are known as Canonical Divisions and their order, Canonical Order

The classes in the first array derived from 'Mathematics the classes in the first array derived from Physics the classes in the first array derived from 'Geology the form classes of 'Literature are arranged only in canonical order

The classes in the first order array derived from Mathematics run thus—

B1	Arithmetic	B6	Geometry
B2	Algebra	B7	Mechanics
B3	Analysis	B8	Physico-Mathematics
B4	Other Methods	B9	Astronomy
B5	Trigonometry		

(8) INCREASING COMPLEXITY

If one of two related classes involves or deals with smaller complexity than the other then that one must have precedence over the other

For example

In Geometry Quadric or Second Degree Curves are less complex and more simple than the 'Cubic or Third Degree Curves There are for example only 6 species of Quadric against 72 of Cubic

It will, therefore, be helpful if 'Quadric Curves get precedence over 'Cubic Curves and similarly if 'Quadric Surfaces get precedence over 'Cubic Surfaces' In fact, this is the order followed in the classification of Geometry in the Colon as well as in the Decimal scheme, the relevant divisions of which read thus:-

C. C No		D C No.
B622 2	Analytical Geometry of Quadric Curves.	516.22
B623:2	Analytical Geometry of Cubic Curves	516.26
B632:2	Analytical Geometry of Quadric Surfaces.	516 42
B633 2	Analytical Geometry of Cubic Surfaces	516 46

The class No B622:2 can be interpreted thus -

B6	is Geometry
B62	is Plane Geometry
B622	is Curves of the Second Degree
:2	is Method Number indicating Algebraic or Analytical

Similarly the Nos B623 2 B632:2 and B633:2 can be interpreted.

B623	represents Curves of the third degree
B632	represents Surface of the second degree
B633	represents surface of the third degree

CANON OF CONSISTENT ORDER

We shall now pass on to the Canon of Consistent Order

It is enunciated thus—

"Whenever the same or similar classes occur in different arrays, their orders should be the same or similar in all such arrays wherever insistence on such sameness or similarity does not violate other more important requirements

This may be referred to as the Canon of consistent Order

Conformity to this canon will be conducive to economy of time and of attention or mental energy It will minimise load on memory both for the classifier and for the user

It is the first aspect of this canon in the form ' arrange the same group of classes in the same order, whatever be the array in which they occur ' that is responsible for certain practices in some of the printed schemes of classification

In the Decimal Classification the geographical classes the classes of Industries and the common subdivisions are arranged in exactly the same order wherever they occur

In the Colon Classification this practice of automatically securing conformity to the canon in question is developed to a much larger extent resulting in great economy in the length of the schedule

COMMON SUBDIVISIONS

Table 2 of the schedules is one of Common Subdivisions the application of which automatically secures that all common subdivision classes found in whatever array fall in the same order

For example

If we take the main class History, the Common Subdivision Classes under this class will get arranged thus:—

Va	A Bibliography of History
Vk	A Dictionary of ,,
Vm	A Periodical of ,,

These Common Subdivision digits will fall in the same order in any other array formed by them under any other class thus:—

Ra	A Bibliography of Philosophy
Rk	A Dictionary of Philosophy
Rm	A Periodical of Philosophy

GEOGRAPHICAL DEVICE

Table 3 of its schedules gives the geographical

divisions. The use of this schedule in securing sameness of classes in all geographical arrays whenever they occur is laid down by rule 62 entitled Geographical Device which "consists in using the appropriate number for the further subdivision of a class which is capable of geographical division or when the individualisation of subclasses may be made to depend conveniently on the place of origin or on the place of prevalence or on the place of habitation or on the place that may be definitely associated with the respective subclasses in any other manner or for any other reason The cases where this device may be applied are generally indicated either in the schedules of classification in Part II or in the Rules of classification in Part I

Examples –

In addition to the geographical classes in Geography History Economics and Sociology following the same order as in the Geographical Table the Geographical Device is also used in several other places such as the classification of dialects and jargons in Philology certain religions in the main class Religion, and certain systems of philosophy in the main class Philosophy Further several common subdivisions such as laboratories, exhibition periodical commissions travels and history are also further subdivided by the Geographical Device The result is that in all these and other similar

cases the geographical classes come in one and the same order

Illustrative:–

(a) P467 Sumerian Language

wherein

P	is Linguistics
4	is Asia
46	is Arabian Peninsula
467	is Iraq (Mesopotamia) which is the place of origin of the Sumerian Language

(b) P615 Chichewa (A Bantu language of British Central Africa)

wherein

P	is Linguistics
6	is Africa
615	is Nyasaland which is the place of origin of the Chichewa language

(c) Q8411 Pre–confucianism

wherein

Q8	is other religions
4	is Asia
41	is China

Q8411 Pre– confucianism the last digit indicates the preferential order of this particular religion

amongst the other religions in China It is an illustration of the Favoured Category Device.

CHRONOLOGICAL DEVICE

Table 5 of the schedules is entitled Chronological Device and rule 63 enunciates the Chronological Device and shows how the arrangement of periods given in this table should be automatically adopted in all cases where classification proceeds on a chronological basis

The Chronological Device is used in quite a large number of cases in the Colon Classification, practically several times in all subjects

It is used in Mathematics for showing

(a) special forms of Diophantine equations
(b) special arithmetic functions
(c) special forms of algebraic equations

Illustratives—

B239M29	Abelian equations
B239M72	Sylow equations

in which,

B23	is Theory of equations
B239	is special equations by the chronological device
M29	indicates the year 1829 when the equation was invented by Abel

Similarly

M72 indicates the year 1872 when the equation was invented by Sylow

(d) special determinants
(e) special algebraic transformations
(f) special types of infinite series
(g) special integrals of real variables
and
(h) special functions of complex variables are divided by the chronological device and in all these cases the chronological classes are arranged in the same order

In fact there is hardly any subject where this device is not employed

COLON DEVICE

In the tables relating to most of the subjects two or more schedules based on different characteristics are given

For example in the table for Medicine we have the Organ Schedule and the Problem Schedule The Organ Schedule contains about 200 classes The problem schedule contains even a larger number of classes But a few of its main classes are Morphology, Physiology Diseases and Growth As a result of the Colon Device the problem divisions of

all the two hundred and odd organ classes automatically get arranged in one and the same order, *viz.* the order in which the problem classes are given in the schedule

Examples,

L:2	Morphology
L:3	Physiology
L:4	Diseases
L183:2	Morphology of the ear
L183:3	Physiology of the ear
L183:4	Diseases of the ear
L185:2	Morphology of the eye
L185.3	Physiology of the eye
L185:4	Diseases of the eye
	and so on

Such an automatic conformity to the Canon of Consistent Order is secured by the Colon Device in every subject The schedules of the Colon Classification consist of a number of standard schedules, which correspond to the standard pieces in a Meccano Apparatus, the colon ( ) playing the role of bolts and nuts By picking out one class at a time from some of the unit schedules according to assigned permutations, the class numbers of all possible classes are constructed The standard order of classes fixed in the unit schedules automatically persists in all arrays where

these classes figure, no matter what the order of the array is.

SUBJECT DEVICE

The enunciation of The Subject Device given under rule 66 reads thus:–

" The Subject Device consists in using appropriate class numbers for the further subdivision or when the individualisation of the subclasses may be made to depend conveniently on respective subclasses in any manner or for any reason "

The cases where this Device may be applied are generally indicated either in the schedules of classification in Part II or in the rules of classification in Part I

This rule adds greatly to the profuseness as well as to the minuteness of the classes At the same time sameness of order is automatically secured wherever it is possible in all similar arrays, This device is also employed frequently in almost all subjects

Examples:–

Several divisions of the Main Class ' Useful Arts are formed by the Subject Device, thus—

MB1 Calculating machines (in which B1 i Arithmetic)

MB9 Horology (in which B9 is Astronomy)
MC3 Gramophones (in which C3 is Sound)

Most of the buildings under the utility characteristic in Architecture are shown by the Subject Device Thus:—

N 1 : 9V 23 Houses of parliament

where in

N 1 is Architecture
: indicates change of characteristic
9 is other buildings
V is History
: indicates change of characteristic
23 is Legislation

Most of the subjects under the figure characteristic in sculpture get their class numbers by the Subject Device Thus —

N2 : 9Q Iconography (Images of gods)
N2 : 3 18V : 25 Marble busts of Politicians

In which,

N2 is Sculpture
: indicates change of characteristic
3 is Marble
: indicates change of characteristic
18 is Busts

V is History

: indicates change of characteristic

25 is politicians

N2:3 18V:231 25w:M69 is Marble bust of Mahatma Gandhi

Most of the implements other material equipments and activities under the problem characteristic in Sociology are arranged by the Subject Device and their order is thus automatically secured to be the same

Y1 348 D *Inauguration of buildings*

in which

Y1 is other social sciences

: indicates change of characteristic

3 is Problem Division meaning Activities, Attitudes

34 *is Ceremonials*

348 is Inauguration

D is Engineering, indicating buildings

BIAS NUMBER DEVICE

The Bias Number Device enunciated in rule 68 is another means by which orders of the same class are secured to be the same, in all different arrays in which they occur

The rule in question reads thus —

' The Bias Number Device is employed for bringing together such of the books in a class as are written with a special bias to some other class or from a special point of view that can be associated with some other class, or for the use of special class of readers whose primary interest of study is in some other class or as have some other special relation to some other class The class to which the book belongs may be termed, the Basic Class and its number may be termed the Basic Number The other class may be termed the 'Bias Class and its number may be termed the 'Bias Number

The Bias Number Device consists in amplifying the Basic Number by the addition of the digit 0 followed by the appropriate 'Bias Number'

Examples:–

B0S *Mathematics for Psychologists*

In which,

B is Mathematics
0 indicates Bias towards another subject
S is Psychology, the Bias subject

Other examples

B280J Statistics for Psychologists
O:2J64 0S Psychology in Shakespeare's plays
T0S The Psychological aspect of Teaching

Thus, in the Colon Classification, conformity to the Canon under consideration is automatically secured in many ways

In our next discourse we shall take up,

(1) Chains of classes, (2) Terminology and (3) Notation for our consideration

REFERENCES

1 Ranganathan (S. R.). Monograph on CLASSIFICATION AND INTERNATIONAL DOCUMENTATION (Review of Documentation. V 14 P 4.) (P 123)



SELF-PERPETUATING

SCHEME OF CLASSIFICATION

"I shall.... assume that changes in classification are necessary permissible and practicable. Then research in classification is necessary Such a research should be on a co-operative basis between the library profession and the profession which specialises in the region of the field of knowledge I which the crisis has developed to a breaking-point. The business of the latter is to feature the specific subjects in the region in the most helpful order The business of the former is to apply facet-and phase-analysis a d determine foci as to fit the specific subject with class numbers that throw them in the preferred helpful order Experience of break down in a few regions and the rebuilding in them may lead us to discover more powerful and lasting notational devices."

— Dr S R Ranganathan

no need to put a decimal point at the beginning of any class number When a new specific subject is formed by a single step of denudation of another specific subject its class number is derived by adding an appropriate digit to that of the latter The Decimal Fraction Notation makes this class number secure its filiatory position for it This advantage persists what ever be the number of steps of denudation The result is that Infinite Hospitality in chain is secured. This device has been adopted by C C and U, D C The possession of a device to secure infinite hospitality in chain should be the Fifth Quality of classificatory language 73

NUMBER OF ENTITIES IN A CHAIN

For further elucidation of the chain under con sideration let us see how the number of entities, comprised in each class decreases as we go down the chain

Thus:—

(a) The class Economics comprises five entities such as (1) Economics (2) Public finance, (3) Taxation, (4) Land tax (5) Irrigation tax

(b) The class Public finance omprises four entities, such as (1) Public finance (2) Taxation (3) Land tax (4) Irrigation tax

(c) The class 'Taxation' comprises three entities such as (1) Taxation, (2) Land tax and (3) Irrigation tax

(d) The class Land tax comprises two entities, such as (1) Land tax and (2) Irrigation tax, and lastly

(e) The class 'Irrigation tax' being the last link of the chain consists of only one entity

NUMBER OF CHARACTERISTICS IN A CHAIN

Again the number of characteristics that have been used to derive each class in the chain from the original universe increases as we go down the chain and reach 'Irrigation tax

This can be illustrated thus: –

(1) Public finance is derived from the class Economics' by the use of one characteristic *viz* 'Business Taxation is derived by the use of two characteristics, *viz.* (1) Business and (2) Type of public finance 'Land tax is derived by the use of three characteristics *viz* (1) Business, (2) Type of public finance, and (3) Type of taxation Lastly 'Irrigation tax' is derived by the use of the previous three characteristics and in addition the 4th characteristic *viz* the type of Land tax

From this illustration, we can conclude that the greater the number of entities comprised in a class the greater is its extension and the less its intension Conversely the greater the number of characteristics used to derive the class, the greater is its intension and the less its extension

In the chain under consideration, we find that Economics comprises the greatest number of entities and hence it forms the first link of the chain and it is the class of the greatest extension in the chain Similarly the class Irrigation tax is derived from the greatest number of characteristics and hence it is the class of the greatest intension and forms the last link of the chain The chain shows how the intension of the classes increases and the extension decreases as we go down the chain and thus this chain satisfies the canon under consideration

LINEAR KINSHIP

It must be remembered that the Canon of Intension cannot be applied to any set of classes which have no linear kinship such as *democracy* and *steam engine* Similarly, it cannot be applied to classes which though belonging to the same main class occur in different chains of subordinations such as birds and reptiles, both of which belong to the same class *animals*, but are not subordinate one to the other i e do not accur

in the same chain and hence we cannot tell which has the greater intension nor if that were decided, would we be able to infer from the decision which had the greater intension or comprised the larger number of subordinate species

PRINCIPLE OF DECREASING EXTENSION

The Canon of Intension is also termed as the Principle of Decreasing Extension and is defined thus —

' If one of two classes is of greater extension than the other and includes the other completely within itself, then that one must have precedence over the other "4

Under the class Physics, Electricity is of greater extension than Current Electricity and includes the latter completely within itself and therfore, Electricity must get precedence over current electricity in the order of arrangement

CANON OF MODULATION

We shall now consider the Canon of Modulation

The definition of the Canon of Modulation reads thus —

A chain of classes should comprise one class of each and every order that lies between the orders of

the first link and the last link of the chain "

This may be referred to as the Canon of Modulation (i e the act of passing from one part to another in a regular and proportionate manner)

Example —

Let us take the example considered while discussing the preceding canon In that example we find that Economics is the first link and 'Irrigation-tax' is the last link of the chain 'Economics' is a class of the order zero and 'Irrigation tax' of the order four The canon of Modulation stipulates that the scheme of classification would be defective, if the chain omitted to give either 'Public finance' or 'Taxation or 'Land tax' which are the classes of the intermediate orders, one two and three in the chain in question

LAMINATION

we have, so far dealt with the canons of classification to be observed in the choice of the characteristics of classification and in the formation of the Several Arrays and Chains of a scheme of classification Dr Ranganathan begins his *Prolegomena* with a Diagramatical Approach to classification The diagram illustrates well the nature and mode of classification and shows how Arrays and Chains of Classes of different orders are formed

in FACET—ANALYSIS

... lecture we have introduced the term —Analysis' and we have seen how different facets based on different trains of characteristics are formed and Arrays of classes are derived from them We have also seen that the classes or foci of different facets are distinctly shown in a class number by putting a colon (:) after everyone of them (This method of Facet-Analysis is one of the special features of the Colon scheme It has automatically solved the problem of individualising ' overlapping specific subjects ' like Anatomy of Flowering Plants ' or ' Physiology of Mammals ' or Curriculum of Elementary Education ' Let us take for our consideration one of these subjects, *viz* Anatomy of Flowering Plants This specific subject consists of two foci derived from two facets *viz* the Natural group of plants facet and ' Problem' facet. The focus ' Anatomy in this specific subject is said to be overlapping as it is applicable to the main class Botany in general as well as to the specific foci in the Natural group facet, such as Flowering Plants This feature of an overlapping subject is diagramatically illustrated by Dr Ranganathan in his *Elements* on page 29 and also in his *memorandum on Classification and International D cumentation* The overlapping focus ' Anatomy ' is shown in the illustration by putting the circle of Flowering Plants '

upon the circle of 'Plant Anatomy' and this feature of putting one circle upon another is termed by Dr Ranganathan as Lamination, which is ' an expressive term current in Metallurgy " meaning " putting layer upon layer....the two layers belonging to different planes of characteristics and requiring to be glued so to speak, "

This illustration shows that a specific subject can be formed by a sharpening of any focus of the first facet by any focus of the second Thus, if there are *m* foci possible in the first facet and *n* foci possible in the second facet *m* x *n* specific subjects can be formed by lamination To satisfy the Principle of Impartiality, the C C gives separate schedules for each of the facets and provides that a number of the first facet may be coupled with a number of the second facet by the digit : (colon). The ordinal value of thi digit is defined to lie between those of 0 and 1 in order that helpful order can be secured Further the C C. gives the Facet Formula and thereby the order in which the numbers are to be coupled is prescribed definitely "

" Facet analysis and the adoption of a number for connecting the facets or some device similar to it Faceted Notation in short is the Sixth Quality which a classificatory language should have. "

Out of the five concepts or fundamental cate gories involved in a scheme of classification, we have so far discussed three of them *viz* (1) Associated scheme of characteristics (2) Arrays of classes and (3) Chains of Classes We shall now take up for our consideration the remaining two categories, *viz* (4) Terminology and (5) Notation

TERMINOLOGY

Terminology is a system of terms used to denote or name the classes in a scheme of classification In the words of Sayers " A classification is expressed in class-names or terms ' (Sayers, Canon No 13)

The terms used should not be vague, should not hide or confuse the original intension They should carry exact meaning of the subject under consideration In other words, " Terms may be any word or phrase which expresses adequately the connotation of the class it names " (Sayers Canon No 14) So also " terms should be unambiguous, They may be technical or popular but with a tendency towards the technical as likely to be more permanent " (Sayers Canon No 15)

This principle regarding terms is put by Bliss as his Canon No 3 under the caption terms dis inctive " which reads thus:—

The terms defining distinct classes should be *distinctive* and be used *consistently* they are virtually but not wholly, *exclusive* of other co-ordinate classes but they are entirely inclusive of their own subclasses "

Dr Ranganathan has enunciated three *Canons* relating to Terminology which must be observed in the construction and use of a scheme of classification

CANON OF CURRENCY

The first canon reads thus —

(1) Each of the terms used to denote the classes in a scheme of classification must be the one in current use *among those who specialise in the universe to* which the scheme is applicable

This may be referred to as the Canon of Currency

This canon implies two things In the first place the terms chosen at the time a scheme of classification is forged should accord with the usage then current among the specialists concerned secondly there should be some arrangement by which the terms can be changed over to current ones, as and when changes take place among the specialists

In this matter the best provided scheme today is the Congress Classification as the library-minded

Gevernment of the United States of America is at the back of the organisation and has provided a liberal establishment of specialists to be in constant charge of the revision of the classification.

The late Dr Melvil Dewey has also provided the necessary machinery for the fulfilment of this canon by his scheme by entrusting the future editions of the Decimal Classification to the Lake Placid Club Education Foundation But, still, to our great surprise, we find that this canon is violated by the scheme in the case of some classes

For example, under 537 Electricity, we find that the scheme uses the term ' Dynamic Electricity ' for the class number 537.5, whereas the term that is now in vogue is Current Electricity '

CANON OF ENUMERATION

The second canon pertaining to Terminology is the Canon of Enumeration

It reads thus —

"The denotation of each term in a scheme of classification should be decided by the enumeration of the classes in the chains which have the class denoted by the term as their common first link "

This may be referred to as the Canon of

Enumeration

This canon becomes necessary as there is no agreement or uniformity in the denotation of terms as used by different persons and by different schemes Nor is it possible to force any such uniformity by the order of any Government or Academy Hence the only course open to users of a scheme of classification is to find out the denotation of a term by a reference to the classes and the chains of subclasses shown to be comprehended by it in the scheme

For example,

The enumeration of the sub-classes of the class denoted by the term 'Arithmetic shows that it com prehends only what is known as 'Lower Arithmetic' in the D C But 'Higher Arithmetic otherwise known as " Theory of Numbers is comprehended by the term Arithmetic' in the Colon Scheme

The Array of the sub classes of Arithmetic in the Decimal Classification reads thus—

511 Arithmetic
511 1 Systems of Arithmetic
511.2 Notation and numeration
Fundamental rules
511.3 Prime numbers
511.4 Fractions

511.5	Analysis Permutation and Combination
511 6	Proportion and Progression
511 7	Involution and Evolution
511.8	Mercantile rules Interest Mensuration
511.9	Problems and tables

The divisions of Arithmetic in the Colon scheme read thus —

B1	Arithmetic
B11	Lower Arithmetic
B12	Concept of numbers
B13	Integers (Theory of numbers)
B15	Algebraic numbers and ideal numbers
B16	Complex and hyper complex numbers
B18	Transcendental numbers

In this Array of classes we find that B11 is specially assigned to Lower Arithmetic B12 Concept of Numbers is intended to hold popular accounts of the 'Concept of Numbers such as Conant s Concept of Numbers and classes from B13 to B18 are classes coming under the province of Higher Arithmetic

In all the schemes but the Colon Classification the enumeration of the sub-classes of the class denoted by the term 'Philosophy' includes Psychology On the contrary Psychology is left out in the enumeration under the class Philosophy in the Colon Classification

and is given a co-ordinate place with Philosophy

CANON OF CONTEXT

The third canon pertaining to Terminology reads thus —

" The denotation of each term in a scheme of classification should be decided in the light of the different classes of lower order belonging to the same primary chain as the class denoted by the term "

This may be referred to as the canon of Context

This canon is necessitated by the fact that one and the same term denotes several different entities in popular as well as technical usage

Let us illustrate this by means of examples

In the Decimal scheme the term ' Accidents occurs in Mining Engineering in Insurance, in the subclass Labour in Economics and in Sociology If we have a book which has the term Accidents as a prominent word in its title, we should not put it into any one of these classes at random We must see that the context in which the term is used in the book agrees with the context in which it is used in the schedule in fixing the class number of the book. In the Colon Classification under the part characteristics for ' Mining Engineering " the 7th division is headed as

'Dangers and accidents' Its class number can be written thus —D3:7

In this number

D is Engineering
D 3 is Mining Engineering
D 3:7 is Accidents

In this chain D3 7 is said to be the last link of the chain and the class denoted by it is called the class of the third order The class D3 is called the class of the first lower order It is with the help of this chain that we are able to confirm the denotation of the term 'Accidents' as 'Accidents' in Minig Engineering in the light of the different classes of lower order belonging to the same primary chain as the class denoted by the term

Sayers has put this canon as his canon No 16 which reads thus —

(16) Terms should be used with a consistent meaning (with reference to context) in every act of classification

Another feature of the Canon of Context is enunciated thus —

" If the term entered in the shedule against a number is by itself incomplete in meaning or is capable

of more than one meaning the correct and complete meaning is to be had by referring to the term that occurs in the same schedule against the class number of which the class number originally considered is a subdivision "

For example

In the Decimal Classification, the class number 537,5 is translated as 'Dynamic which is an adjective

" By looking a few lines higher up we find that 537 is translated as Electricity From this, we infer that the adjective 'Dynamic is to be completed by the addition of the noun Electricity In actuality, however the noun is omitted against 537 5 and taken as understood This practice of omitting words on the part of the classificationist and of mentally supplying the omitted word on the part of the classifier does lead to economy in the construction of the schedules of classification and therefore in such cases the Canon of Context is required to be taken into consideration for elucidating the correct and complete meaning of the term which is incomplete in meaning or is capable of more than one meaning.

CANON OF RETICENCE

The fourth Canon pertaining to Terminolgy reads thus: –

"The terms used to denote the classes in a scheme *of classification should not be critical*"

This may be referred to as the Canon of Reticence *which means avoidance of giving* out exact meaning; or concealment of real significance or meaning

The term Humbugs (133 7) *used in the* Decimal scheme to denote certain classes under meta psychology (133 to 135) is a glaring instance of this unpardonable misuse of the term and negligence shown *to this Canon*

The term frequently occuring in the Decimal *much against the canon of Reticence is* 'Minor nor Authors is found scattered over all the pages of the Literature schedule It is beyond the province of the classifier to adjudge men of letters as 'Major' and *Minor*' Regarding the faulty use of this term Dr Ranganathan, in his '*Elements of Library Classification*' (P 56) observes thus:—

"Again even supposing that a particular author is now so generally taken to be insignificant that there is likely to be no offence in referring to him now as *Minor*' how can we be sure that he may not in course of time, *rise in public estimate so as to be* included among Major writers ?

These four canons about ' *Terminology* can be

well satisfied if the scheme of classification consists of schedules of fundamental constituent terms based on the relevant trains of characteristics and the digits assigned to these terms giving permanence to their meaning How this permanence of meaning of terms is effected by the classificatory language is well described by Dr Ranganathan, thus —

' The individual digits of the base form at once the radicals and the phonemes of the classificatory language. A concatenation of a number of basic digits –radicals and phonemes–can be intelligible only if it conforms to the rules of construction of the classificatory language These rules constitute its grammar A classificatory language has only substantives and connectives It is an isolating Language *i e* the digits of radicals are not subjected to any morphological change like the elements of most of the known natural language A disturbing quality of a natural language is ambiguity and impermanence of the meaning of terms and therefore, of assemblages of terms These qualities cannot be eliminated since a natural language is used by one and all and the folk–force deforming it is beyond control by any body But an artificial language which is used by a disciplined few can be controlled by rules In fact the rules of a classificatory language must ensure that every intelligible concatenation of digits

has a unique and permanent meaning i e. re one and only one specific subject for ever "

' The Second Quality of a classificatory langua, is permanence of meaning and absence of homonyms '

NOTATION

Regarding Notation, Sayers observes, thus —

' When our classification was equipped with Generalia and Form Classes and Divisions, it requirec two accessories to make its application to books practicable These were a notation and an index The more important of these is notation, "

A notation is defined by Richardson as a short hand sign He observes, thus: —" The notation which is really a condensed word for each class but which nevertheless may and should convey a representation not merely of the division, but also of the sequence, and not only of the artificial sequence, but of the logical sequence so far as it can be expressed.'

The criteria of Notation are that it must be brief, simple and flexible

PURE AND MIXED

A notation which uses one and only one species of digits is said to be pure

The *notation of the Decimal Classification is pure* as it uses only one species of digits

A notation which uses two or more species of digits is said to be mixed The notation of the Colon Classification is mixed as it uses seven species of digits

PURE VS. MIXED NOTATION

About these two kinds of notation there are many differences of opinion Some say that it should be completely pure i e it should consist either of numerals or of letters of the alphabet only Another class of specialists have come to the conclusion that it ought to be mixed i e. it should consist of two or more kinds of symbols. The necessity of keeping constantly a filiatory order of books and other literary resources in the shelves and the ever increasing complications in the branches of knowledge compels us to adopt a mixed notation with various useful devices

Dr Ranganathan has recently observed about a Mixed Base of Notation thus —

The fact that the numbers constituting a classificatory language i e involved in a classification scheme, need to be used only in the ordinal sense implies that the numbers and the digits in them need not have cardinal values This gives us freedom to allow the basic digits of ordinal numbers to go beyond the traditional 0 1 2 9 Any compact and brief symbol convenient to write and pronounce may if necessary be included in the basic set of digits

provided its ordinal position among the already existing digits is unequivocally defined This factor has been utilised, with great circumspection and continence, by the C C and the U D C this is a necessity in any scheme of classification of knowledge A base which consists of digits of more than one conventional group is Mixed Base

" Mixed base may be mentioned as the First Quality of a classificatory language "[2]

INDIVIDUALISATION

The notation assigned to a book should be as brief as possible *but it ought to be sufficiently coextensive* *i e* it ought to convey a complete symbolic exposition of the subject treated in the book

In the words of Dr Ranganathan ' In the terminology of classificatory science, an ordinal number formed by an intelligible concatenation of digits is called a Class Number and the specific subject of whose name it is the translation, is called a Class A class and a class number are, therefore, co-extensive It may be stated that class number of a specific subject is that class *number of the preferred* classification scheme which is co-extensive with it Such a class number is said to individualise any specific subject whatever

" Capacity to individualise any specific subject is the Third Quality of a classificatory language "[10]

LINEAR NOTATION

As far as possible, the notation should be easy to read, write and remember and it should be so flexible as to allow insertions at any point without dislocating the sequence of the arrangement

As it is possible for a notation to build its numbers in *one or more dimensions Dr Ranganathan* has introduced the terms Linear notation, Plane notation and Solid notation In book-classification we are concerned with Linear notation,

' Taking the linear notation two modes of progression are possible in reading and writing the digits They may progress from left to right or from right to left The former mode is called Right Handed notation and the latter Left Handed notation

' Taking the right handed notation which is the more common further subdivisions can be recognised by the *effect that is produced by the addition* of another digit at the right end of a number Begin with the number 346 and let us add 5 at the right end We get 3465 If we read the numbers as integers in the former *the place value of 3 is 300* that of 4 is 40 and that of 6 is six In the latter the place value of 3 is

3000, that of 4 is 400 and that of 6 is 60 while that of the newcomer 5 is only 5 In other words the addition of a digit at the right end changes the place values of the digits that exist already

' On the contrary, let us imagine a decimal point to be understood to the left of the digit 3 Then, in both the numbers the place value of 3 is 3/10 that of 4 is 4/100 and that of 6 is 6/1000, while that of the newcomer 5 is 5/10,000 In other words, the addition of a digit at the right end does not change the place values of the digits that exist already

' An Integral notation is one in which the place values of the digit of a number change when an extra digit is added at the end of a number "

A Decimal notation is one in which the place values of the digits of a number remain intact when an extra digit is added at the end of the number "11

ABSOLUTE ORDINAL VALUES

Regarding the absolute ordinal values of the digits, they are conveniently fixed in the species of Arabic numerals, as of increasing order when we progress from 0 towords 9 The scale may be fixed similarly in the case of other species and in regard to the relative values of the digits of different species

' In the simplest form of the Decimal

classification only two species of digits are used–Arabic numerals and a dot ...The need for fixing the absolute value of the dot does not arise, as it occurs in the fourth place and the fourth place only and no other digit ever accur in the fourth place."[12]

In the Colon classification seven species of digits are used They are: –

(1) the 10 Arabic numerals
(2) the 26 Capital letters of the Roman Alphabet
(3) the 24 small letters of the Roman Alphabet
(4) a colon (:)
(5) a dash (—)
(6) a dot ( ) and
(7) a delta (△)

The absolute values of the digits are fixed by a rule to be of increasing order as we progress from a to Z, thus:—

a b y z 0 : –, , 1 2, .. 8, 9, A B y z.

Another rule provides that a number followed by a small letter occupies a lower place in the scale than the number itself–a rule by which the so called ' anterior ' divisions are secured in anterior ' pl

We shall deal with ' anterior ' divisions in our next talk

The interpolation of the ordinal number, colon between zero and one has given an enormous capacity to the notation of the scheme In fact it is to signify and emphasise the potentiality of this ordinal number that the scheme itself is called the Colon Classification

CANON OF RELATIVITY

We now pass on to the canon of Relativity which stipulates that the length of a class number in a scheme of classification should be proportional to the order or intension of the class it represents

This may be referred to as the Canon of Relativity

Regarding the use of the word ' Relativity ' the author observes thus: –

' We may perhaps use the word uniformity to express the opposite of Relativity as applied to length of class numbers.

It would have been more appropriate to have called this canon, the Canon of Elasticity We speak of the elastic ribbon But as some have popularised the use of this word in the sense of hospitality, I refrain from using it with a new *significance Hence the term* Canon of Relativity

To illustrate the exact representation of a subject in a class number the author has given an example of a book, *viz.* History of Indian Statistical Studies of Surgery in intestinal diseases, 1944

The class number of the book is
L25:4:7 B28p2.N4

This number can be split up into three parts which are called the three phases of the class number by the author They can be shown thus—
Phase

L 25 4 7 which means Surgery in intestinal diseases We shall interprete it thus'—

L is Medicine
25 is Organ Facet meaning Intestines
: indicates change of characteristic
4 is Problem Facet meaning Diseases'
: indicates change of characteristic
7 represents *Handling Facet meaning* 'Surgery'

Here ends the First Phase

Phase II

The second phase comprises of the digits B28 meaning Statistical Studies, in which

B is Mathematics
28 is Statistics

This phase is called secondary phase of the third species on the analogy of the three species of the secondary phase recognised by the author

They are:—

(1) The phase of the Common Subdivisions, which is called the Secondary Phase of the first species

(2) The phase of a subject towards which the exposition of the primary phase is biased or by which it is influenced or with which it institutes a comparison This type of Phase is called the Secondary Phase of the second species or Point of View Phase or Bias Device Phase

(3) The third species of the Secondary Phase is the Phase of a Subject which is subordinated to it as a tool or method of investigation or as indicating the aspect of the subject studied This secondary phase of the third species uses the Last Octave Device or the Penultimate Octave Device which are also termed as the Subject Device These devices we shall explain while discussing the Canon of Hospitality in Array

In the present instance the secondary phase is of the third species as the subject represented by it indicates the aspect of study which is 'statistical studies and hence the primary phase is augmented by the digits B28 representing the subject 'statistical

studies' the colon between the two phases indicates the change of phases Then comes the third phase which is of the first species as it takes the common subdivision 'history' which is the form of exposition of the subject. The third phase is two faceted, having geographical division for the first facet and chronological division for the second facet

This illustration will enable us to understand how the Colon Classification has skillfully used mixed notation and how it has increased considerably the potentiality of the scheme

PHASE ANALYSIS

We may quote here recent observations of Dr Ranganathan about Phase Analysis and the adoption of helpful numbers to connect phases. He observes under the caption Loose Assemblage' in his memorandum on *Classification and International Documentation*, thus–

" A specific subject, which is formed in any combination of the above-said ways–dissection denudation and lamination or formation of a new or a compounded sharper focus–i e by combination of foci belonging to one or more facets of a subject is said to be of a single phase Another way in which a specific subject may be formed is by the Assemblage of two subjects of single phase It is said to be of two Phases To construct the class number of such a

specific subject that is to translate its name into the classificatory language we first analyse it into the two phases, decide which is primary and which is secondary, construct the number of each phase and assemble them together by the prescribed connecting symbol Different connecting symbols are prescribed for the different parts which the secondary Phase may play

181 Biasing Phase

" For example consider the specific subject ' Partial linear differential equations of the second order ' and illumination electrical engineering" The subject expounded is the former but the exposition is such that it is turned on the illumination electrical engineering The latter merely biases the exposition The former subject is, therefore, the primary phase and the latter the secondary phase In this case the relation between the two phases is described as Bias Relation and the secondary phase i called the Biasing Phase

The connecting symbol prescribed for the bia relation is 0 in the C C and : or (024) in the U D C The translation of the specific subject is got as follows —

C C	English	U D C
B334:1:2	Partial linear differ- ential equations of	517 947 4

	the second order	
D66:5	Illumination electrical engineering	621 32
B334.1t20D66:5	Part I linear differential equations of the second order for illumination electrical engineering	517 947 4:621.32

182 Tool Phase

"Let us consider as another example, the specific subject Periodogram analysis af economic cycles in cotton textile industry" Here the two phases are "Periodogram analysis" and "Economic cycles in cotton textile industry" The subject under investigation is the latter The former is used only a a tool for study The latter is therefore the primary phase and the former is the secondary phase The relation between the two phases is called Tool Phase The connecting symbol is (ı) in the C C as well as the U D C The translation of the specific subject is got as follows:-

C C	English	U D C
X9M71 74	Economic Cycles in cotton textile industry	338 54:677 2
B386	Periodogram analysis	519 28

X9M71:748286	Periodogram analysis of economic cycles in cotton textile industry	338 54:677 2:519 28

183 Influencing Phase

" Here is a third specific subject of two phases: ' Concentration of *population* as influenced by industries " This is a subject on which a Royal Commission sat with Sir Montague Barrow as *Chairman* Here the two phases are "Concentration of population" and "Industries' The chief phenomenon which has called for attention is the former The latter appears only as the casual or Influencing Factor The *former is therefore, the primary phase and the latter* is the secondary phase. The relation between the two phases is called the Influencing Phase The connecting symbol is at present *z8* in the C C and U D C The translation of the specific subject is got as follows—

C. C.	English	U D C
Y1:585	*Concentration of* population	312 91
X9	Industries	338
Y1.585z8X9	Concentration of population as influenced by	312 91:338

Industries

184 Anterior Classes

" The addition of facets and phases, other than the influencing phase, increase the intension and decrease the extension But the influencing phase does not affect the extension or intension of the primary phase It covers the whole of the primary phase, It only indicates a mode of approach to the primary phase There are other phases too which do not affect the extension or intension of the primary phase but only indicate the form of exposition or the method of approach Bibliography, encyclopaedia, periodical history and symposium are examples of Form-Phase Comparison similarity, and difference are examples which call for other Approach-Phases, Specific subjects obtained by the use of these types of secondary phases may be said to be formed by varying the way in which the primary phase is dressed. They constitute materials auxiliary or preliminary to the study proper of the primary phase Before entering into the city proper, so to speak of the primary phase the reader will be considerably helped if he browses in the suburbs, as it were and glances through the auxiliary and preliminary expositions represented by these specific subjects The Laws of Library Science will therefore be better satisfied if the specific subjects formed by attaching such secondary phases are placed before the